District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources
Department
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-144
July 21, 2008

For temporary pits, closed-loop systems, and below-grade tanks, submit to the appropriate NMOCD District Office.
For permanent pits and exceptions submit to the Santa Fe Environmental Bureau office and provide a copy to the appropriate NMOCD District Office.

Pit, Closed-Loop System, Below-Grade Tank, or Proposed Alternative Method Permit or Closure Plan Application

Type of action: ☒ Permit of a pit, closed-loop system, below-grade tank, or proposed alternative method
☐ Closure of a pit, closed-loop system, below-grade tank, or proposed alternative method
☐ Modification to an existing permit
☐ Closure plan only submitted for an existing permitted or non-permitted pit, closed-loop system, below-grade tank, or proposed alternative method

Instructions: Please submit one application (Form C-144) per individual pit, closed-loop system, below-grade tank or alternative request

Please be advised that approval of this request does not relieve the operator of liability should operations result in pollution of surface water, ground water or the environment. Nor does approval relieve the operator of its responsibility to comply with any other applicable governmental authority's rules, regulations or ordinances.

1.
Operator: Read & Stevens, Inc. OGRID #: 18917
Address: PO Box 1518, Roswell, NM 88202-1518
Facility or well name: Hot Dog 23 Federal #4
API Number: 30-015-40841 OCD Permit Number:
U/L or Qtr/Qtr ___ Section 23 Township 16S Range 27E County: Eddy
Center of Proposed Design: Latitude Longitude NAD: ☒ 1927 ☐ 1983
Surface Owner: ☒ Federal ☐ State ☐ Private ☐ Tribal Trust or Indian Allotment

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NMOCD ARTESIA

2.
☒ **Pit:** Subsection F or [illegible] 11 NMAC
Temporary: ☒ Drilling ☐ Wo[illegible]
☐ Permanent ☐ Emergency ☐ Cavit[illegible]
☒ Lined ☐ Unlined Liner type: Thickness [illegible] ☒ LLDPE ☐ HDPE ☐ PVC ☐ Other
☒ String-Reinforced
Liner Seams: ☒ Welded ☒ Factory ☐ Other Volume: 1500 bbl Dimensions: L 55' x W 90' x D 5'

Permit submittal withdrawn by operator

3.
☐ **Closed-loop System:** Subsection H of 19.15.17.11 NMAC
Type of Operation: ☐ P&A ☐ Drilling a new well ☐ Workover or Drilling (Appl[illegible]es which require prior approval of a permit or notice of intent)
☐ Drying Pad ☐ Above Ground Steel Tanks ☐ Haul-off Bins ☐ Other
☐ Lined ☐ Unlined Liner type: Thickness mil ☐ LLDPE ☐ HDPE ☐ PVC [illegible]
Liner Seams: ☐ Welded ☐ Factory ☐ Other

4.
☐ **Below-grade tank:** Subsection I of 19.15.17.11 NMAC
Volume: bbl Type of fluid:
Tank Construction material:
☐ Secondary containment with leak detection ☐ Visible sidewalls, liner, 6-inch lift and automatic overflow shut-off
☐ Visible sidewalls and liner ☐ Visible sidewalls only ☐ Other
Liner type: Thickness mil ☐ HDPE ☐ PVC ☐ Other

5.
☐ **Alternative Method:**
Submittal of an exception request is required. Exceptions must be submitted to the Santa Fe Environmental Bureau office for consideration of approval.

6.

Fencing: Subsection D of 19.15.17.11 NMAC *(Applies to permanent pits, temporary pits, and below-grade tanks)*

☐ Chain link, six feet in height, two strands of barbed wire at top *(Required if located within 1000 feet of a permanent residence, school, hospital, institution or church)*

☒ Four foot height, four strands of barbed wire evenly spaced between one and four feet

☐ Alternate. Please specify_____

7.

Netting: Subsection E of 19.15.17.11 NMAC *(Applies to permanent pits and permanent open top tanks)*

☐ Screen ☐ Netting ☐ Other Not Applicable

☐ Monthly inspections (If netting or screening is not physically feasible)

8.

Signs: Subsection C of 19.15.17.11 NMAC

☐ 12"x 24", 2" lettering, providing Operator's name, site location, and emergency telephone numbers

☒ Signed in compliance with ~~19.15.3.103 NMAC~~ 19.15.16.8 NMAC

9.

Administrative Approvals and Exceptions:

Justifications and/or demonstrations of equivalency are required. Please refer to 19.15.17 NMAC for guidance.

Please check a box if one or more of the following is requested, if not leave blank:

☐ Administrative approval(s): Requests must be submitted to the appropriate division district or the Santa Fe Environmental Bureau office for consideration of approval.

☐ Exception(s): Requests must be submitted to the Santa Fe Environmental Bureau office for consideration of approval.

10.

Siting Criteria (regarding permitting): 19.15.17.10 NMAC

Instructions: The applicant must demonstrate compliance for each siting criteria below in the application. Recommendations of acceptable source material are provided below. Requests regarding changes to certain siting criteria may require administrative approval from the appropriate district office or may be considered an exception which must be submitted to the Santa Fe Environmental Bureau office for consideration of approval. Applicant must attach justification for request. Please refer to 19.15.17.10 NMAC for guidance. **Siting criteria does not apply to drying pads or above-grade tanks associated with a closed-loop system.**

Ground water is less than 50 feet below the bottom of the temporary pit, permanent pit, or below-grade tank. - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells **SEE FIGURE 1**	☐ Yes ☒ No
Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; Visual inspection (certification) of the proposed site **SEE FIGURE 2**	☐ Yes ☒ No
Within 300 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. *(Applies to temporary, emergency, or cavitation pits and below-grade tanks)* - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image **SEE FIGURE 3**	☐ Yes ☒ No ☐ NA
Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. *(Applies to permanent pits)* - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image **Does not apply**	☐ Yes ☐ No ☒ NA
Within 500 horizontal feet of a private, domestic fresh water well or spring that less than five households use for domestic or stock watering purposes, or within 1000 horizontal feet of any other fresh water well or spring, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database search; Visual inspection (certification) of the proposed site **SEE FIGURES 1 nnd 3**	☐ Yes ☒ No
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. **SEE FIGURES 1 and 4** - Written confirmation or verification from the municipality; Written approval obtained from the municipality	☐ Yes ☒ No
Within 500 feet of a wetland. - US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site **SEE FIGURE 5**	☐ Yes ☒ No ☐ Yes ☒ No
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Mineral Division **SEE FIGURE 6**	☐ Yes ☒ No
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; Topographic map **SEE FIGURE 1**	☐ Yes ☒ No
Within a 100-year floodplain. - FEMA map **SEE FIGURE 7 (last figure)**	

11.
Temporary Pits, Emergency Pits, and Below-grade Tanks Permit Application Attachment Checklist: Subsection B of 19.15.17.9 NMAC
Instructions: Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

- ☐ Hydrogeologic Report (Below-grade Tanks) - based upon the requirements of Paragraph (4) of Subsection B of 19.15.17.9 NMAC
- ☒ Hydrogeologic Data (Temporary and Emergency Pits) - based upon the requirements of Paragraph (2) of Subsection B of 19.15.17.9 NMAC
- ☒ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☒ Design Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☒ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
- ☒ Closure Plan (Please complete Boxes 14 through 18, if applicable) - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC

☐ Previously Approved Design (attach copy of design) API Number: _____ or Permit Number: _____

12.
Closed-loop Systems Permit Application Attachment Checklist: Subsection B of 19.15.17.9 NMAC
Instructions: Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

- ☐ Geologic and Hydrogeologic Data (only for on-site closure) - based upon the requirements of Paragraph (3) of Subsection B of 19.15.17.9
- ☐ Siting Criteria Compliance Demonstrations (only for on-site closure) - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☐ Design Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
- ☐ Closure Plan (Please complete Boxes 14 through 18, if applicable) - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC

☐ Previously Approved Design (attach copy of design) API Number: _____

☐ Previously Approved Operating and Maintenance Plan API Number: _____ *(Applies only to closed-loop system that use above ground steel tanks or haul-off bins and propose to implement waste removal for closure)*

13.
Permanent Pits Permit Application Checklist: Subsection B of 19.15.17.9 NMAC
Instructions: Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

- ☐ Hydrogeologic Report - based upon the requirements of Paragraph (1) of Subsection B of 19.15.17.9 NMAC
- ☐ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☐ Climatological Factors Assessment
- ☐ Certified Engineering Design Plans - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Dike Protection and Structural Integrity Design - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Leak Detection Design - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Liner Specifications and Compatibility Assessment - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Quality Control/Quality Assurance Construction and Installation Plan
- ☐ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
- ☐ Freeboard and Overtopping Prevention Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Nuisance or Hazardous Odors, including H_2S, Prevention Plan
- ☐ Emergency Response Plan
- ☐ Oil Field Waste Stream Characterization
- ☐ Monitoring and Inspection Plan
- ☐ Erosion Control Plan
- ☐ Closure Plan - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC

14.
Proposed Closure: 19.15.17.13 NMAC
Instructions: Please complete the applicable boxes, Boxes 14 through 18, in regards to the proposed closure plan.

Type: ☒ Drilling ☐ Workover ☐ Emergency ☐ Cavitation ☐ P&A ☐ Permanent Pit ☐ Below-grade Tank ☐ Closed-loop System ☐ Alternative

Proposed Closure Method:
- ☐ Waste Excavation and Removal
- ☐ Waste Removal (Closed-loop systems only)
- ☒ On-site Closure Method (Only for temporary pits and closed-loop systems)
  - ☒ In-place Burial ☐ On-site Trench Burial
- ☐ Alternative Closure Method (Exceptions must be submitted to the Santa Fe Environmental Bureau for consideration)

15.
Waste Excavation and Removal Closure Plan Checklist: (19.15.17.13 NMAC) ***Instructions: Each of the following items must be attached to the closure plan. Please indicate, by a check mark in the box, that the documents are attached.***

- ☐ Protocols and Procedures - based upon the appropriate requirements of 19.15.17.13 NMAC
- ☐ Confirmation Sampling Plan (if applicable) - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC
- ☐ Disposal Facility Name and Permit Number (for liquids, drilling fluids and drill cuttings)
- ☐ Soil Backfill and Cover Design Specifications - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC
- ☐ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC
- ☐ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

16.
Waste Removal Closure For Closed-loop Systems That Utilize Above Ground Steel Tanks or Haul-off Bins Only: (19.15.17.13.D NMAC)
Instructions: Please indentify the facility or facilities for the disposal of liquids, drilling fluids and drill cuttings. Use attachment if more than two facilities are required.

Disposal Facility Name: _____ Disposal Facility Permit Number: _____

Disposal Facility Name: _____ Disposal Facility Permit Number: _____

Will any of the proposed closed-loop system operations and associated activities occur on or in areas that *will not* be used for future service and operations?
☐ Yes (If yes, please provide the information below) ☐ No

Required for impacted areas which will not be used for future service and operations:
☐ Soil Backfill and Cover Design Specifications - - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC
☐ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC
☐ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

17.
Siting Criteria (regarding on-site closure methods only): 19.15.17.10 NMAC
Instructions: Each siting criteria requires a demonstration of compliance in the closure plan. Recommendations of acceptable source material are provided below. Requests regarding changes to certain siting criteria may require administrative approval from the appropriate district office or may be considered an exception which must be submitted to the Santa Fe Environmental Bureau office for consideration of approval. Justifications and/or demonstrations of equivalency are required. Please refer to 19.15.17.10 NMAC for guidance.

Ground water is less than 50 feet below the bottom of the buried waste. - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	☐ Yes ☒ No ☐ NA
Ground water is between 50 and 100 feet below the bottom of the buried waste - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	☐ Yes ☒ No ☐ NA
Ground water is more than 100 feet below the bottom of the buried waste. - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	☒ Yes ☐ No ☐ NA
Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within 300 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image	☐ Yes ☒ No
Within 500 horizontal feet of a private, domestic fresh water well or spring that less than five households use for domestic or stock watering purposes, or within 1000 horizontal feet of any other fresh water well or spring, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database; Visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. - Written confirmation or verification from the municipality; Written approval obtained from the municipality	☐ Yes ☒ No
Within 500 feet of a wetland. - US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Mineral Division	☐ Yes ☒ No
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; Topographic map	☐ Yes ☒ No
Within a 100-year floodplain. - FEMA map	☐ Yes ☒ No

18.
On-Site Closure Plan Checklist: (19.15.17.13 NMAC) ***Instructions: Each of the following items must be attached to the closure plan. Please indicate, by a check mark in the box, that the documents are attached.***
☒ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC
☒ Proof of Surface Owner Notice - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC
☐ Construction/Design Plan of Burial Trench (if applicable) based upon the appropriate requirements of 19.15.17.11 NMAC
☐ Construction/Design Plan of Temporary Pit (for in-place burial of a drying pad) - based upon the appropriate requirements of 19.15.17.11 NMAC
☒ Protocols and Procedures - based upon the appropriate requirements of 19.15.17.13 NMAC
☒ Confirmation Sampling Plan (if applicable) - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC
☒ Waste Material Sampling Plan - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC
☒ Disposal Facility Name and Permit Number (for liquids, drilling fluids and drill cuttings or in case on-site closure standards cannot be achieved)
☒ Soil Cover Design - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC
☒ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC
☒ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

19.
Operator Application Certification:
I hereby certify that the information submitted with this application is true, accurate and complete to the best of my knowledge and belief.

Name (Print): Randall Hicks Title: Agent

Signature: Randall Hicks Date: 3/7/12

e-mail address: r@rthicksconsult.com Telephone: 505-266-5004

20.
OCD Approval: ☐ Permit Application (including closure plan) ☐ Closure Plan (only) ☐ OCD Conditions (see attachment)

DENIED

OCD Representative Signature: _____ **Approval Date:** _____

Title: _____ **OCD Permit Number:** _____

21.
Closure Report (required within 60 days of closure completion): Subsection K of 19.15.17.13 NMAC
Instructions: Operators are required to obtain an approved closure plan prior to implementing any closure activities and submitting the closure report. The closure report is required to be submitted to the division within 60 days of the completion of the closure activities. Please do not complete this section of the form until an approved closure plan has been obtained and the closure activities have been completed.

☐ **Closure Completion Date:** _____

Permit submittal withdrawn by operator

22.
Closure Method:
☐ Waste Excavation and Removal ☒ [illegible]re Method ☐ Alternative Closure Method ☐ Waste Removal (Closed-loop systems only)
☐ If different from approved plan, please ex[illegible]

23.
Closure Report Regarding Waste Removal Closure Fo[illegible] Systems That Utilize Above Ground Steel Tanks or Haul-off Bins Only:
Instructions: Please indentify the facility or facilities for wh[illegible] drilling fluids and drill cuttings were disposed. Use attachment if more than two facilities were utilized.

Disposal Facility Name: _____ [illegible]sal Facility Permit Number: _____

Disposal Facility Name: _____ [illegible]cility Permit Number: _____

Were the closed-loop system operations and associated activities performed on or in ar[illegible]t be used for future service and operations?
☐ Yes (If yes, please demonstrate compliance to the items below) ☐ No

Required for impacted areas which will not be used for future service and operations:
☐ Site Reclamation (Photo Documentation)
☐ Soil Backfilling and Cover Installation
☐ Re-vegetation Application Rates and Seeding Technique

24.
Closure Report Attachment Checklist: ***Instructions: Each of the following items must be attached to the closure repo[illegible] ease indicate, by a check mark in the box, that the documents are attached.***
☐ Proof of Closure Notice (surface owner and division)
☐ Proof of Deed Notice (required for on-site closure)
☐ Plot Plan (for on-site closures and temporary pits)
☐ Confirmation Sampling Analytical Results (if applicable)
☐ Waste Material Sampling Analytical Results (required for on-site closure)
☐ Disposal Facility Name and Permit Number
☐ Soil Backfilling and Cover Installation
☐ Re-vegetation Application Rates and Seeding Technique
☐ Site Reclamation (Photo Documentation)
On-site Closure Location: Latitude _____ Longitude _____ NAD: ☐ 1927 ☐ 1983

25.
Operator Closure Certification:
I hereby certify that the information and attachments submitted with this closure report is true, accurate and complete to the best of my knowledge and belief. I also certify that the closure complies with all applicable closure requirements and conditions specified in the approved closure plan.

Name (Print): _____ Title: _____

Signature: _____ Date: _____

e-mail address: _____ Telephone: _____

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

March 7, 2012

Mr. Mike Bratcher
NMOCD District 2
811 S. First Street
Artesia, New Mexico 88210
Via E-mail

RE: Hot Dog 23 Federal #4
Read and Stevens, Inc.

Dear Mike:

For the above-referenced temporary pit, the complete C-144 package is attached. The Power of Attorney form naming Randy Hicks as the agent for Read and Stevens has been previously submitted to NMOCD.

BLM is currently reviewing the APD and we have submitted a copy of this C-144 to BLM. This letter is copied to the BLM and serves as our notice to the surface owner that on-site burial is anticipated at this location.

Note that this package includes a set of "generic plans" that will accompany all future drilling pit permits for Read and Stevens. These generic plans are based upon NMOCD-approved plans for the Marbob 5H well (approved by you and Brad Jones) and the Frio #1 well (approved by Ed Martin of District 4). I am confident that you will find these generic plans are consistent with the approved submissions. The only part of the permit that is unique to this Hot Dog well is the Site Specific Information and the C-144, both of which are at the front of the permit package.

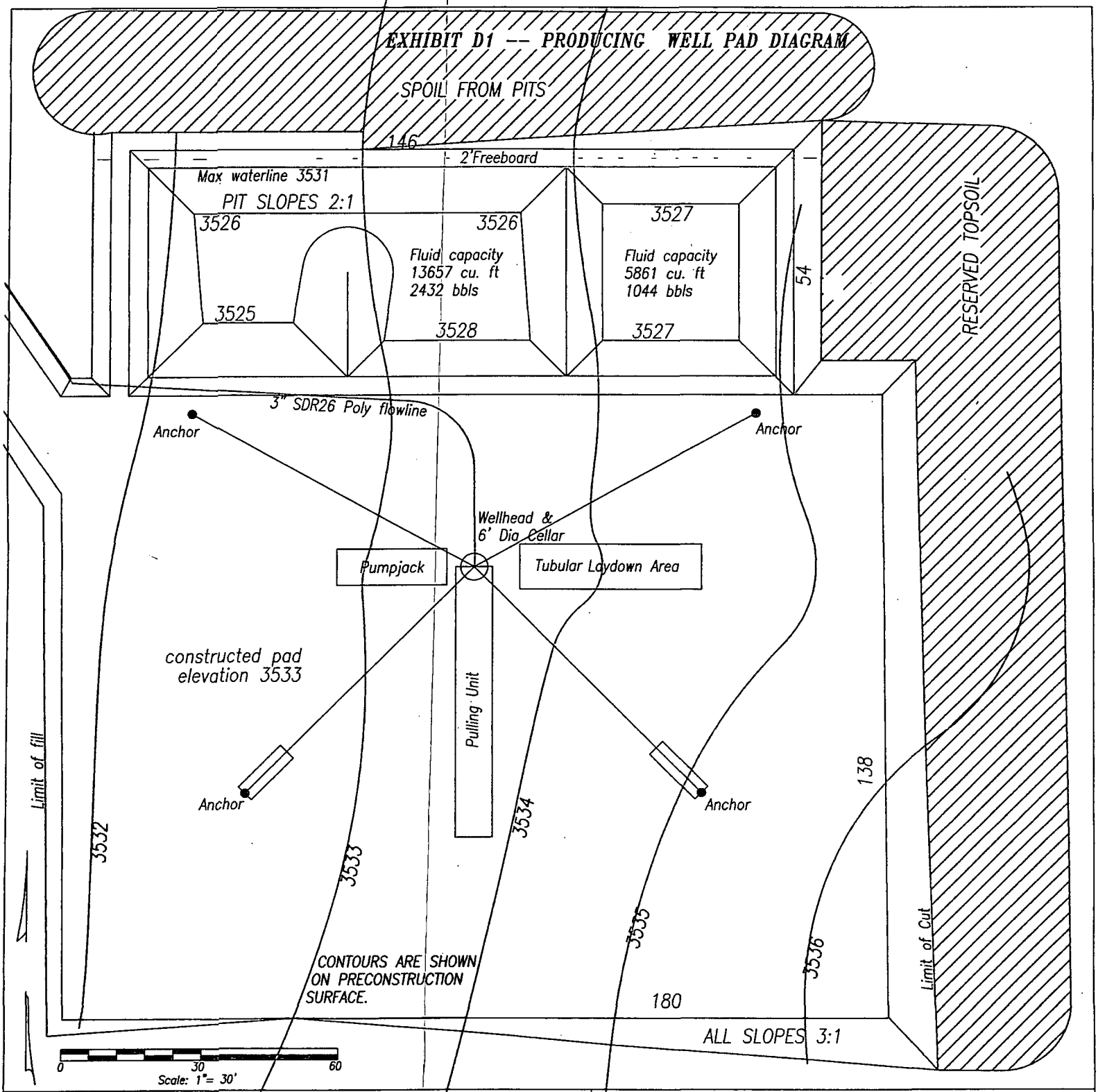
Please pay attention to our proposal for a cell of the temporary pit that is separate from the reserve pit. We named this cell of the temporary pit a workover pit in the submission for lack of a better term. This cell, which is meant to hold make-up water for drilling and stimulation and hold flow-back water from the stimulation, may not be used. Although the preferred closure is in-place, trench burial may be necessary. We propose to convert the workover cell to a burial trench. Any such conversion would be done in a manner consistent with NMOCD Rules and we would not proceed with trench burial until we notify District 2 and obtain permission for such a conversion. Please call me with any questions.

Sincerely,
R.T. Hicks Consultants

Randall Hicks

Copy: Tim Collier, Read and Stevens
BLM Carlsbad District Office

UPDATED DRAWING FYI



P. R. PATTON
STATE OF
6913
NEW MEXICO
REGISTERED PROFESSIONAL ENGINEER

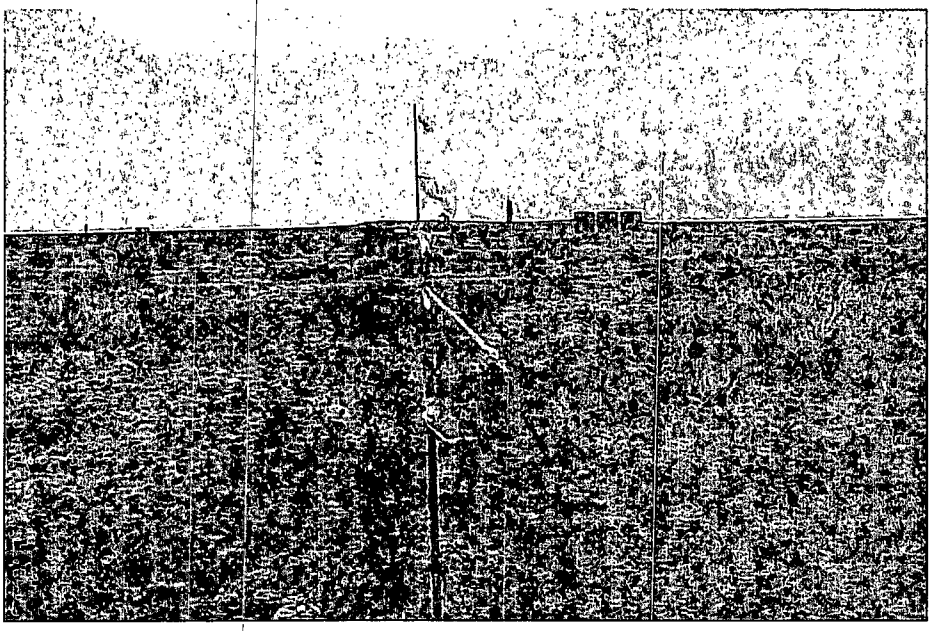
P.R. Patton & Associates
Consulting Engineers
Surveyors
Petroleum Bldg.
Roswell, N.M. 88203
575 / 622-9106

Read & Stevens, Inc.

HOT DOG 23 FED. No. 4
990 FSL 330 FWL, Sec. 23
T16S, R27E, N.M.P.M.,
EDDY COUNTY, NEW MEXICO

March 2012

C-144 Permit Package for Hot Dog 23 Federal #4 Section T R Eddy County NM



Prepared for
Read and Stevens, Inc.
Roswell, New Mexico

Prepared by
R.T. Hicks Consultants, Ltd.
Albuquerque, New Mexico

C-144 and Site Specific Information for Drilling Pit

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

Hydrogeologic Report

The information identified in item 10, "Siting Criteria" of the C-144 is attached as: are:

1. Figure 1 – Groundwater Geologic Map with depth to groundwater data from the OSE and USGS databases. Please note
   a. The location of the temporary pits is in the center of the red, orange, **yellow** and green distance circles
   b. Water wells in the OSE database are shown as blue squares with their OSE permit number, depth to groundwater and date of measurement – some OSE wells are mis-located in the WATERS database and new data from the WATERS database are presented in Table 1.
   c. Most OSE wells do not include a depth to groundwater
   d. The USGS has no data for the area.
2. Figure 2- USGS topographic map of the area. These maps show
   a. locations of any significant watercourses (blue lines in some drainages),
   b. surface water (in blue), which are stock ponds
   c. the location of the temporary pits in the center of the colored distance circles
   d. the location of the Dog Canyon well in the southeast corner of the Figure.
3. Figure 3a – 2008 aerial photograph showing
   a. Surface water as presented in Figure 2
   b. The pipeline and oil field roads as present in 2008
   c. windmill turbines (lower left of photograph)
   d. stock ponds (compare with Figure 2)
   e. the absence of other structures
4. Figure 3b is a 2011 Google Earth image of the same area as Figure 3a.
5. Figure 4 - is a map that also shows the location of the nearest incorporated municipal boundary (Artesia), about 10 miles southwest of the temporary pit location
6. Figure 5 – from http://107.20.228.18/Wetlands/WetlandsMapper.html# showing that wetlands are identified as not being in the area directly surrounding the site.
7. Figure 6 – shows the location of the nearest identified mines (quarries), which are shown as green circles. No subsurface mines were identified in the area.
8. Figure 7 – shows the area in relation to identified unstable areas, identified as the purple karst area on the bottom of the map
9. Figure 8 FEMA map – The full-scale index map states defines area around the pit as Zone X, unshaded, indicating the area is a minimal flood risk.

Siting Criteria Compliance Demonstration

As designated in the C-144 the location of the pit and on-site closure meet the criteria of NMOCD Rules. We believe the data presented in Figures 1-8 and Appendix SSI-1 demonstrate that the following statements are true:

1. Groundwater is GREATER than 100 feet below the bottom of the temporary pit and on-site closure method

The PRRC database of OSE and USGS wells presents several data points in the area of interest. The OSE well RA-02550 could not be located in the field at the reported location. Review of the water rights file in the Roswell District Office of the NMSEO shows the correct location to be in

Township 15 South, rather than 16 South as reported on the log, thus indicating that this well is mis-located on the WATERS database and thus mis-plotted on Figure 1. According to the OSE water rights records, well RA-02550 is in Section 27 T15S R27E, about 6 miles north of the location plotted on Figure 1.

Well RA-04176 provides reasonable data for the area. This permit is for an exploratory water well that was meant to supply water for drilling nearby oil wells. The paper files at the Roswell Office of the OSE show that the well was drilled to a depth of 450 feet and discovered no water. The USGS filed log for the oil test drilled at this location states that there are no "Water Bearing Formations" encountered. The fact that RA-04176 encountered no water is not surprising when one looks at the mud log for the Hot Dog 23 Federal #3, (which is only 1000 ft SSW of RA-04176), and which is in the same Section as the proposed temporary pits. The mud log (Appendix SSI-2) shows salt (halite) is present throughout most of the shallow section and the shallow geology is dominated by anhydrite, siltstone and dolomite.

At the Hot Dog 23 Federal #4, groundwater (as defined by New Mexico Rules) is not present.

2. **The pit, excavated material and on-site closure is NOT within 300 feet of a continuously flowing watercourse, or within 200 feet of any other significant watercourse or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark).**

Figures 2 and Appendix SSI-1 confirm this statement. The topographic map of Figure 2 shows an identified drainage (blue dashed line) about 2000 feet northwest of the location.

3. **The pit, excavated material and on-site closure is NOT within 300 feet of a permanent residence, school, hospital, institution, or church in existence at the time of initial application.**

Figures 2-3 and Appendix SSI-1 confirm this statement.

4. **The pit, excavated material and on-site closure is NOT within 500 feet of a private, domestic fresh water well or spring used by less than five households for domestic or stock watering purposes, it is NOT within 1,000 feet of any other fresh water well or spring.**

Figures 1-3 and Appendix SSI-1 support this statement.

5. **The pit, excavated material and on-site closure is NOT within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended.**

Figure 4 confirms this statement.

6 **The pit, excavated material and on-site closure is NOT within 500 feet of a wetland.**

Figure 5 and Appendix SSI-1 confirm this statement.

7. **The pit, excavated material and on-site closure is NOT within an area overlying a subsurface mine.**

Figure 6 confirms this statement. All of the mines shown on Figure 6 are surface mines and are typically caliche pits.

8. The pit, excavated material and , on-site closure is NOT within an unstable area. Although Figure 7 shows that site lies within a Karst area indicated by the lavender color on the map, many oil wells and drilling pits have operated in this area without incident. When one compares the mapped karst feature with the New Mexico geologic map, the karst is coincident with the outcrop of the Artesia Group, which is characterized by evaporates (salt, anhydrite) and dolomite, both of which are subject to solution features. Although the lavender color suggests that fissures, tubes and caves can exist, these features have not impaired the development of oil and gas wells in the area, the use and closure of drilling pits, or the use of large water ponds for hydraulic fracturing.

Because the evidence suggests the possible presence of solution feature, the design of the pit calls for engineering features to minimize the potential that such solution features will compromise the integrity of the temporary pit.

9. The pit, excavated material and on-site closure is NOT within a 100-year floodplain. Our site visit confirms this statement. We saw no geologic evidence of flooding (see Appendix SSI-1). The FEMA map shows the site is located in Zone X, indicating the area is minimal flood hazard.

Design of Temporary Pit

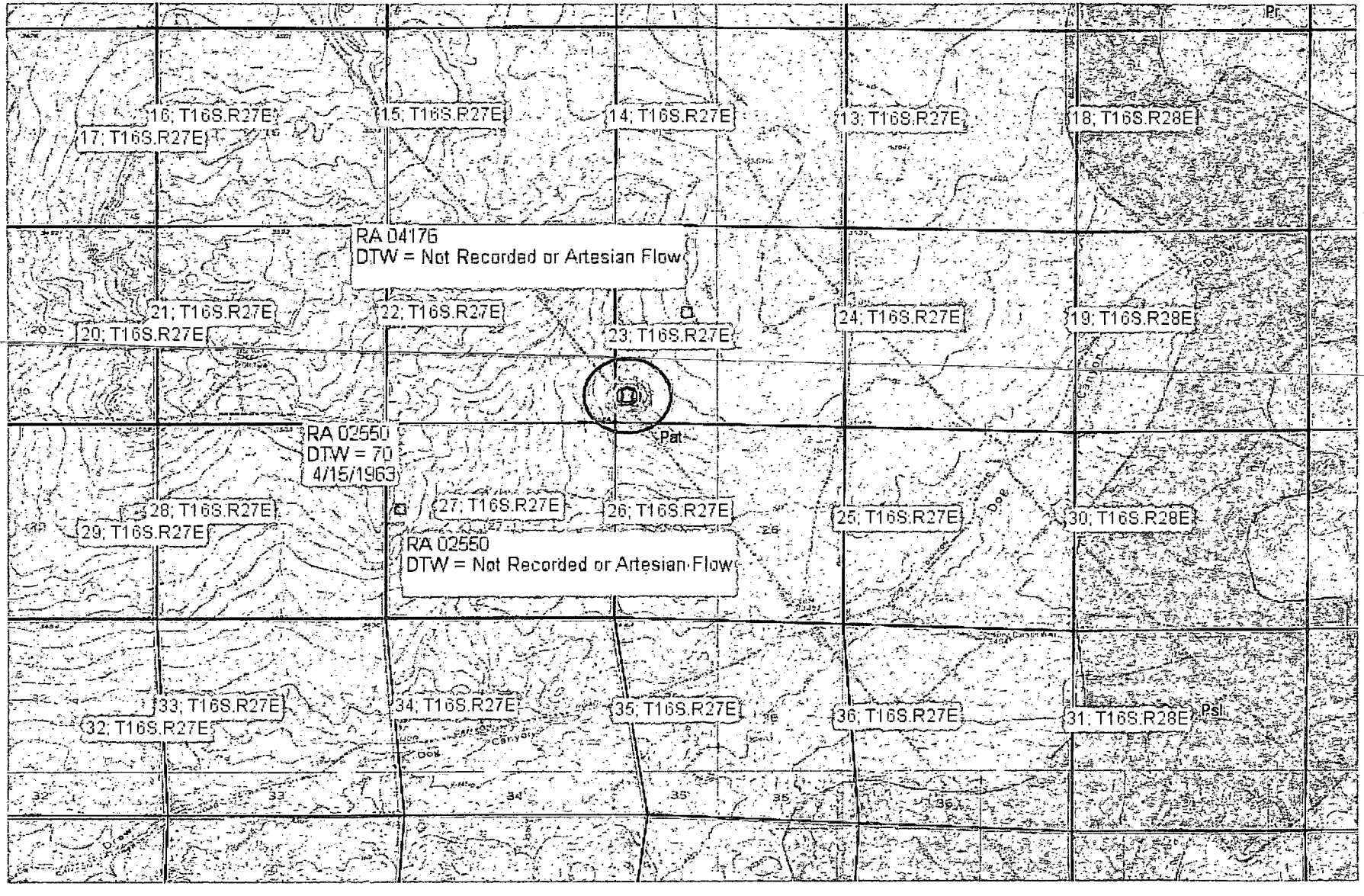
Plates SSI-1 and SSI-2 show the design features of the temporary pit. The Design and Construction Plan is included in this submission.

Note that the plan calls for a drilling pit and what is labeled as a "workover pit", for lack of a better term. This pit, if installed, will hold make up water for drilling and stimulation and flow-back water from the stimulation.

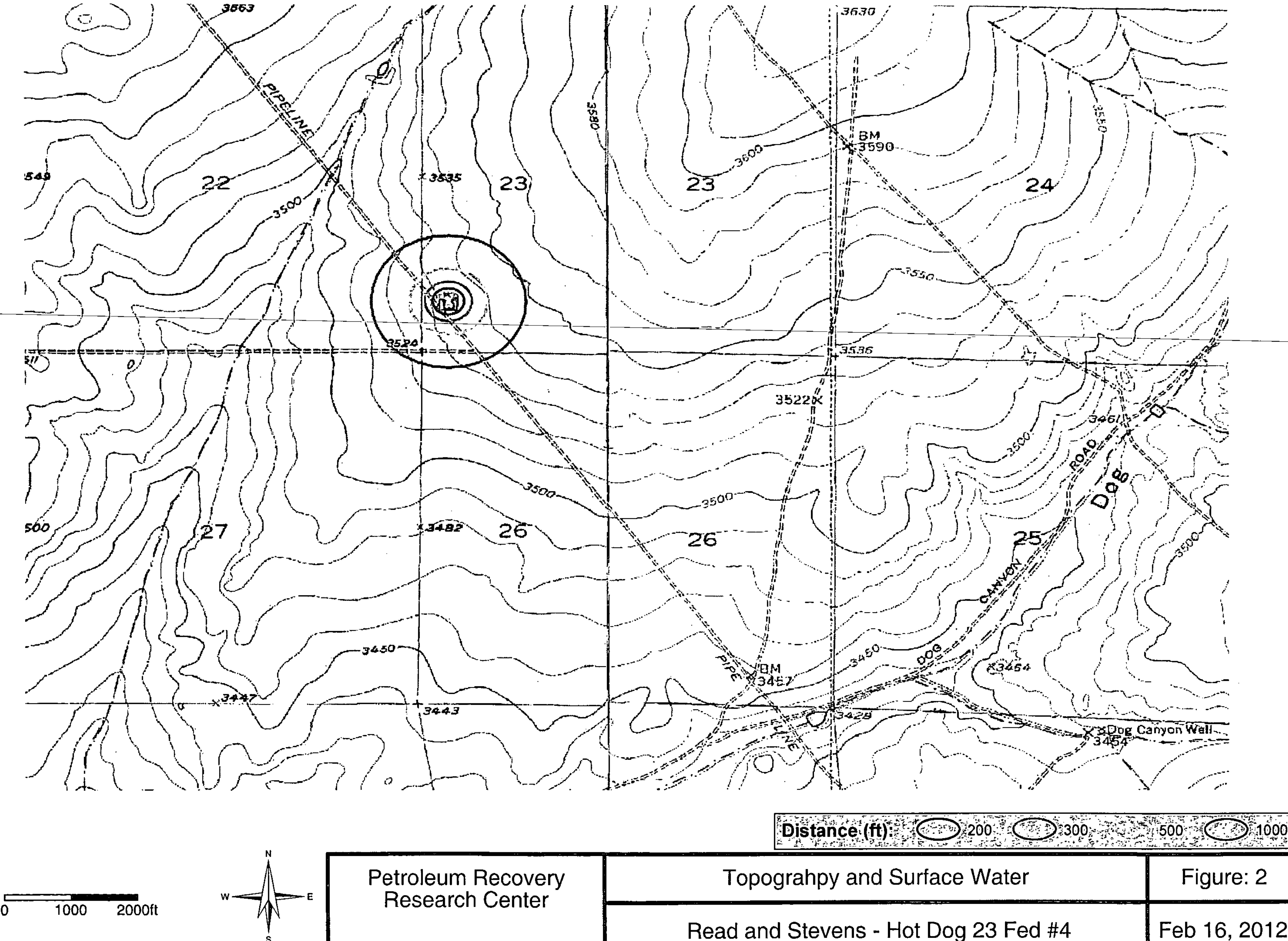
This pit is also called a burial trench in Plate SSI-1. If trench burial is necessary at this site, this pit will be converted to a burial trench in conformance with NMOCD Rules. Because the closure plan calls for in-place closure, we will notify NMOCD prior to converting this pit to a burial trench and will proceed with trench burial only after NMOCD approval.

Figures

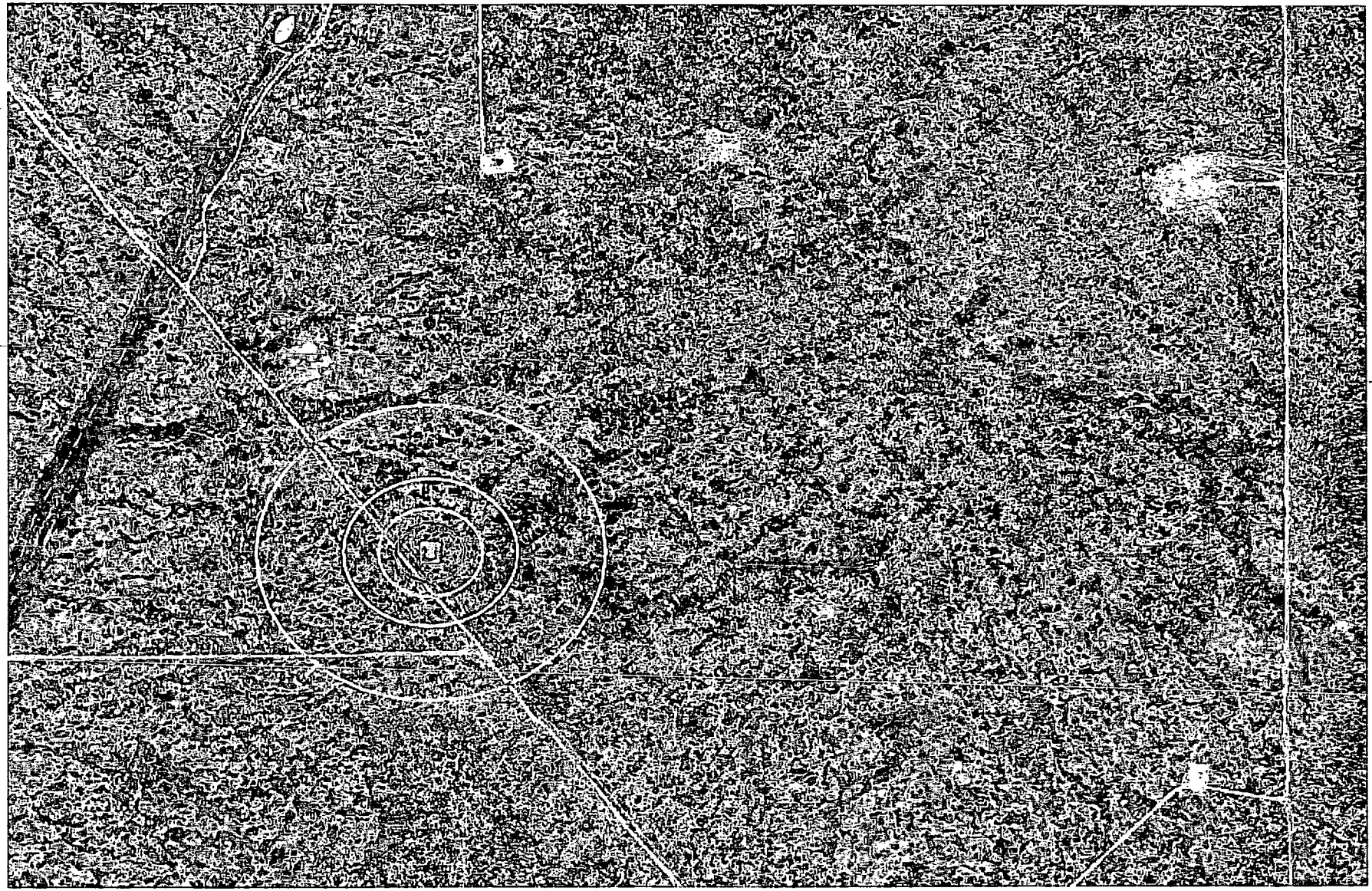
R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104



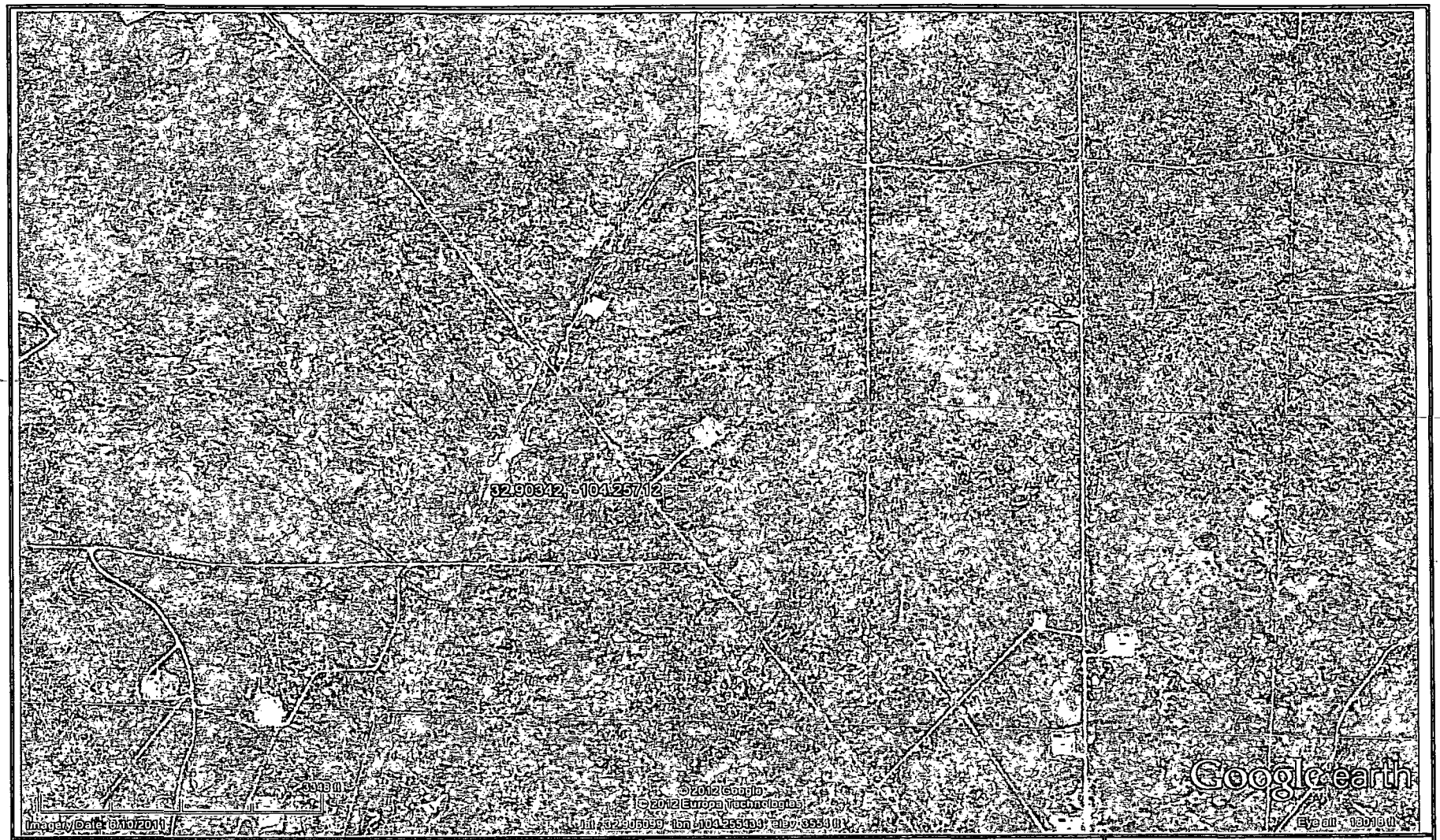
Petroleum Recovery Research Center	Geology and Depth to Water	Figure: 1
	Read and Stevens - Hot Dog 23 Fed #4	Feb 16, 2012



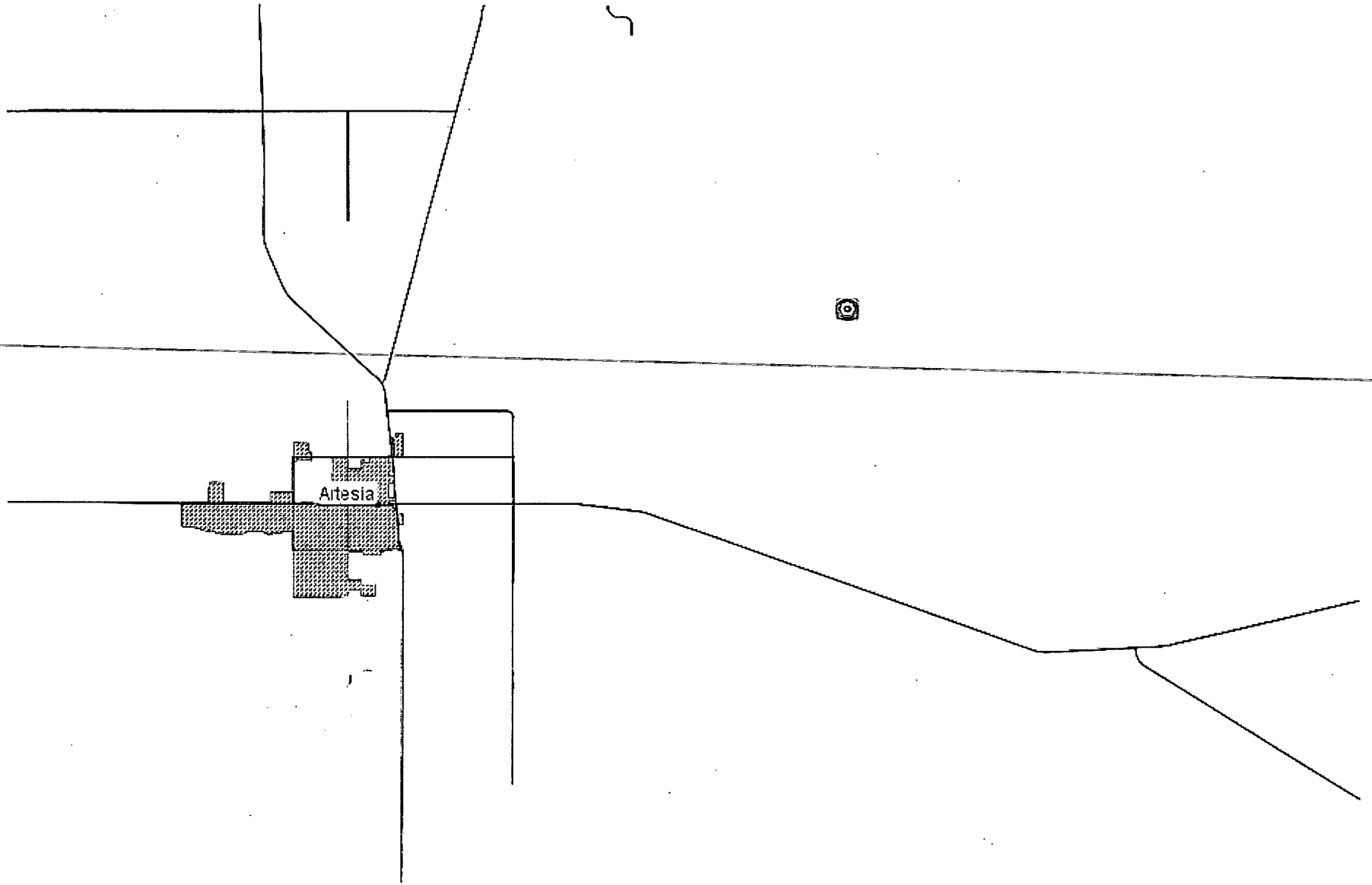
Petroleum Recovery Research Center	Topograhpy and Surface Water	Figure: 2
	Read and Stevens - Hot Dog 23 Fed #4	Feb 16, 2012



Petroleum Recovery Research Center	2005-2006 Air Photo	Figure: 3a
	Read and Stevens - Hot Dog 23 Fed #4	Feb 16, 2012



R.T. Hicks Consultants Albuquerque, NM	Google Earth Image - 2011	Figure 3b
	Read and Stevens Hot Dog 23 Federal #4	Feb-12



Distance (ft): 200 300 500 1000

0 2 4mi

N W E S

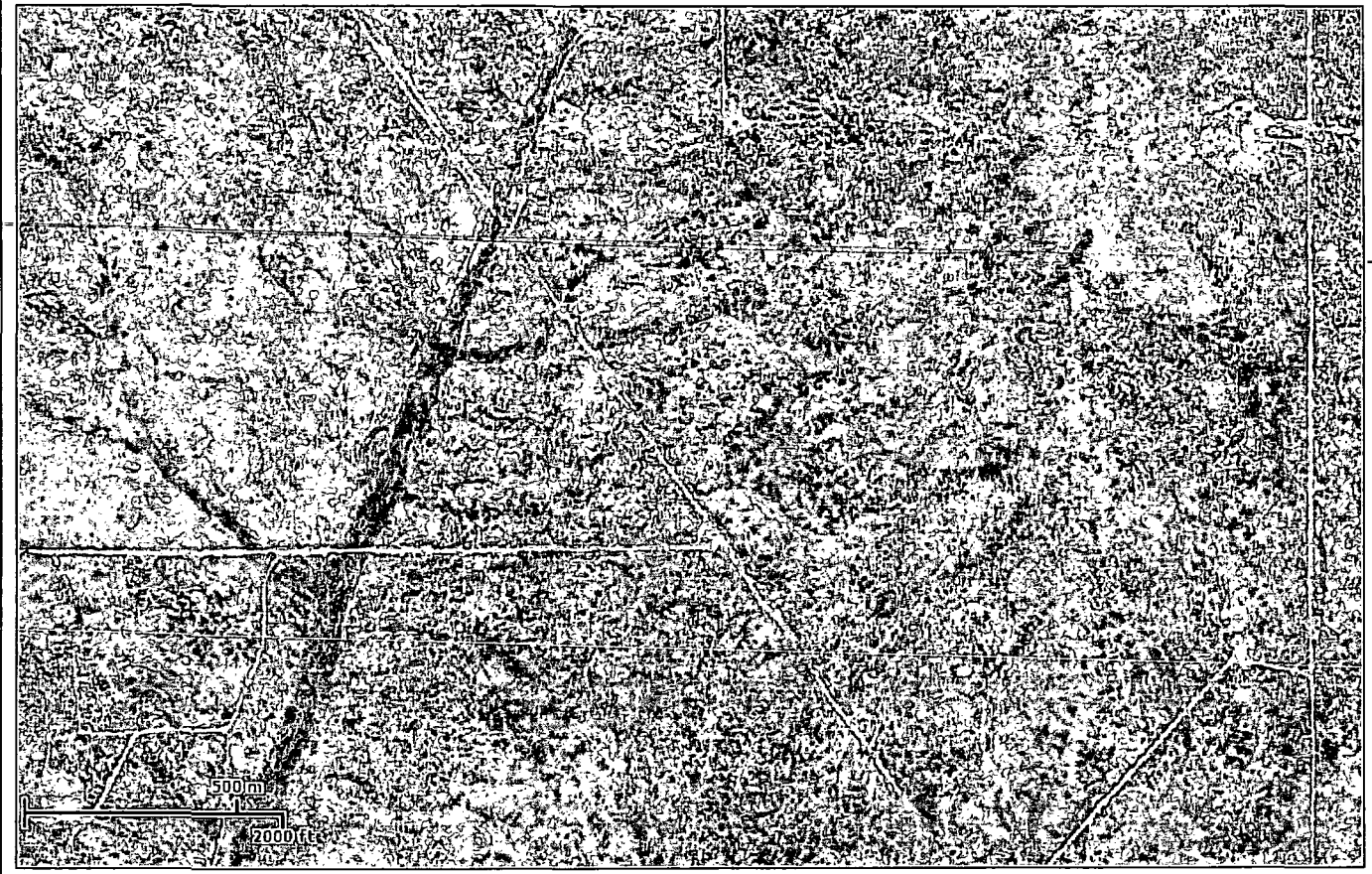
Petroleum Recovery Research Center	Nearest Incorporated Municipality	Figure: 4
	Read and Stevens - Hot Dog 23 Fed #4	Feb 16, 2012

U.S. Fish and Wildlife Service

National Wetlands Inventory

Figure 5: Wetlands Map

Feb 16, 2012



Wetlands

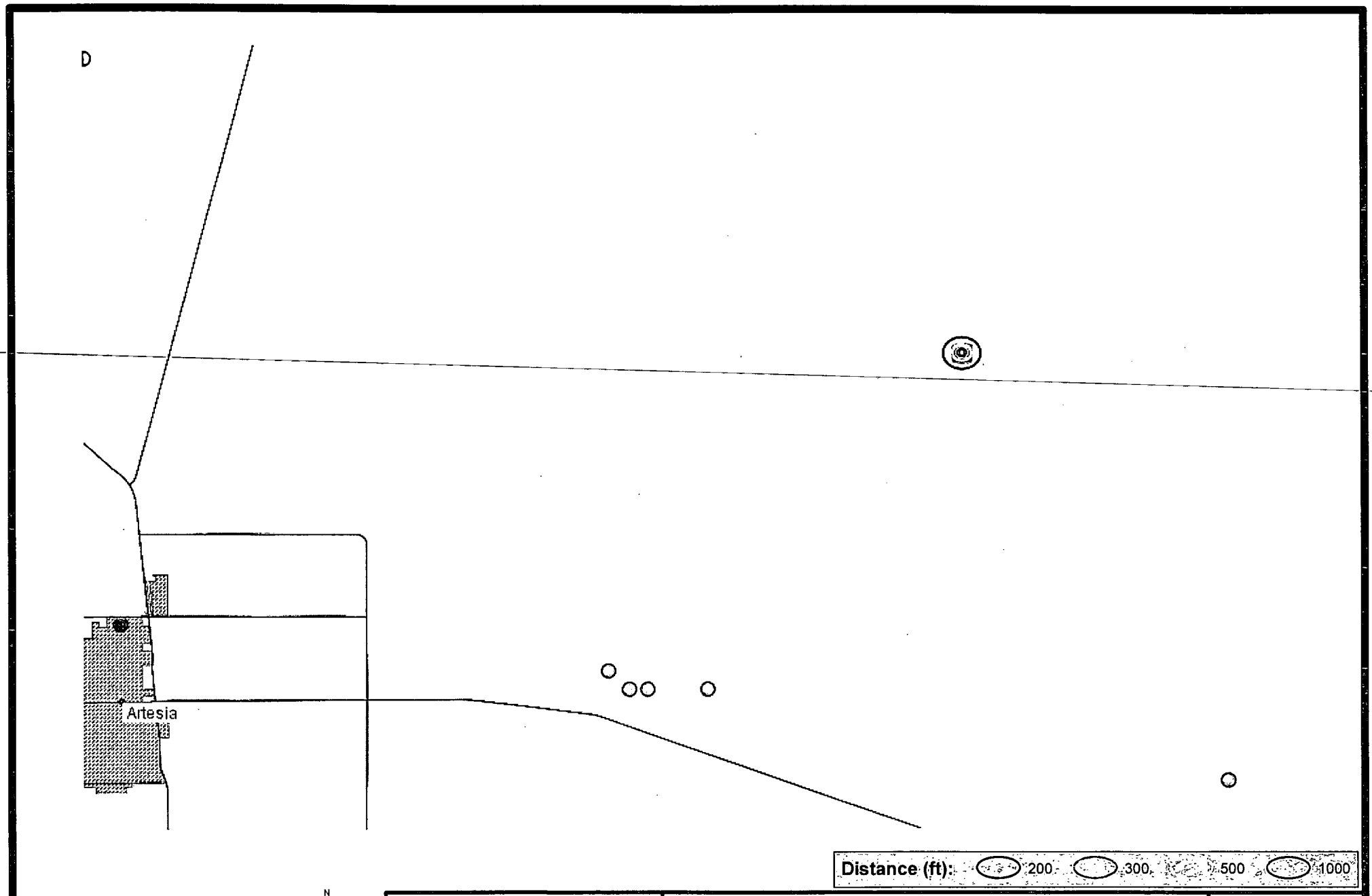
- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Riparian

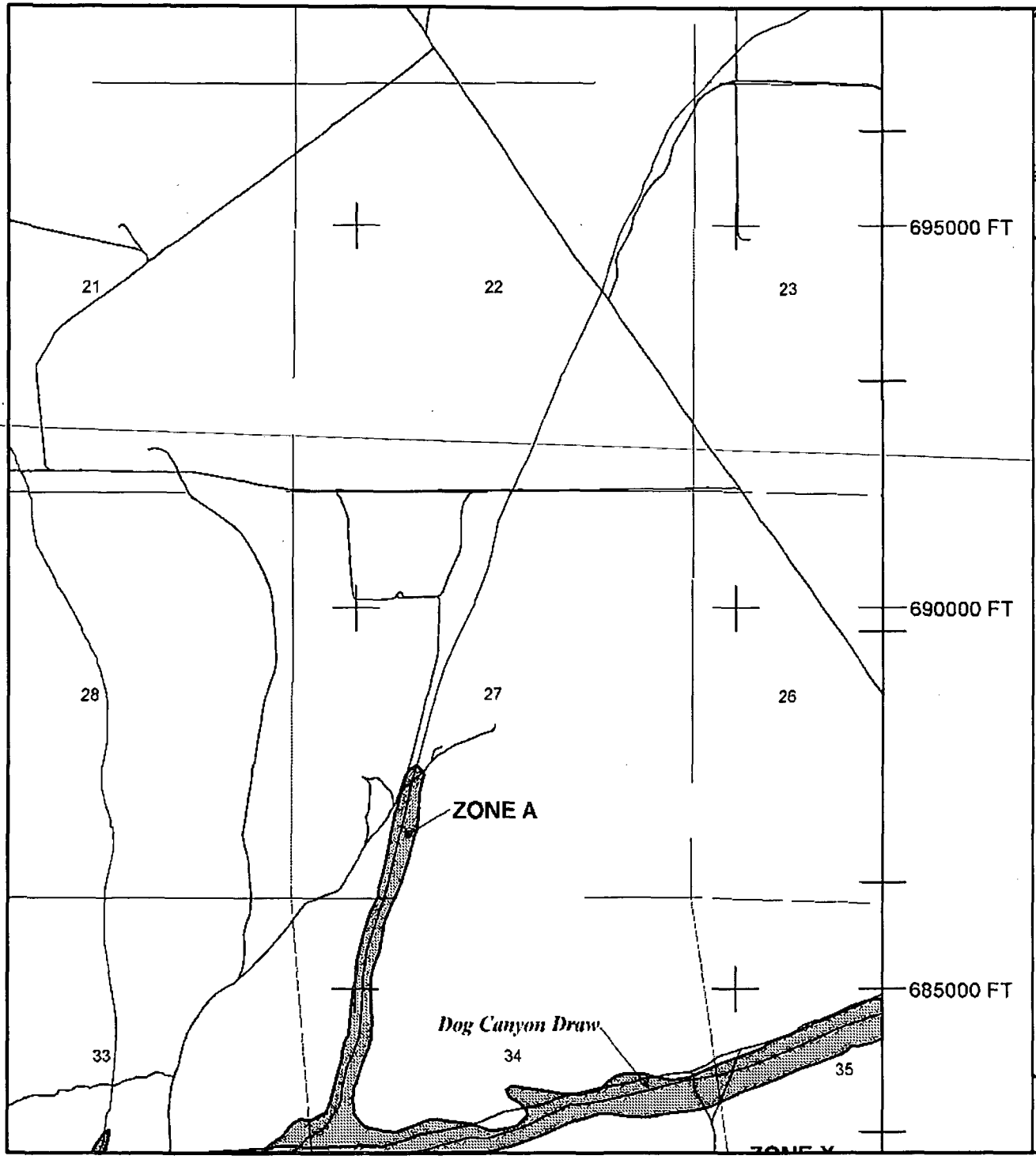
- Herbaceous
- Forested/Shrub

User Remarks:

Read and Stevens - Hot Dog 23 Fed. #4



Petroleum Recovery Research Center	Nearest Mines	Figure: 6
	Read and Stevens - Hot Dog 23 Fed #4	Feb 16, 2012



e Program at 1-800-638-6620.

MAP SCALE 1" = 2000'

0 0 1,000 2,000 3,000 4,000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0125D

FIRM

FLOOD INSURANCE RATE MAP
EDDY COUNTY, NEW MEXICO
AND INCORPORATED AREAS

PANEL 125 OF 2000

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EDDY COUNTY, UNINCORPORATED AREAS	350120	0125	D

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
35015C0125D

EFFECTIVE DATE
JUNE 4, 2010

Federal Emergency Management Agency

Plates

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

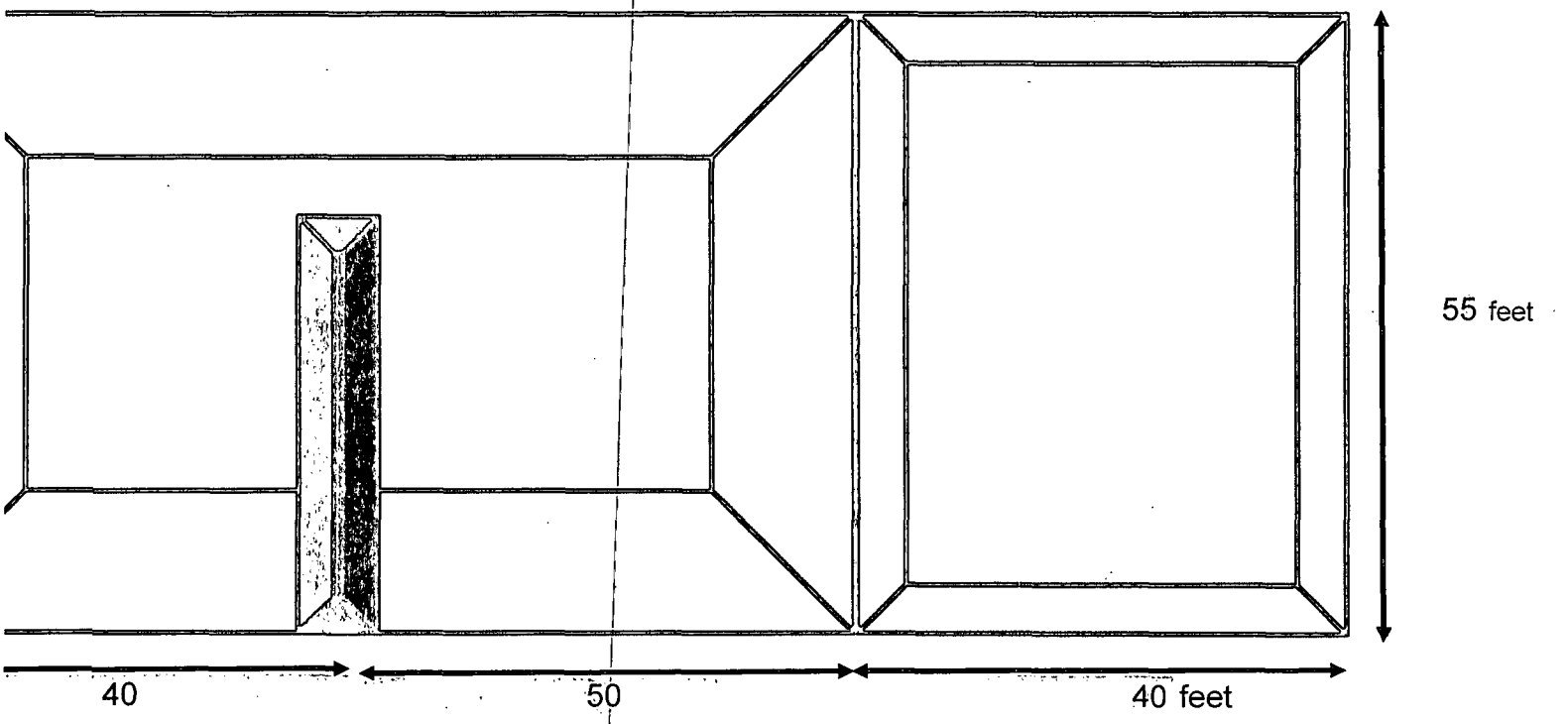
ıe after stabilization = hole

3.5	=	2,229	82.56	39

ıcity of drilling pit	1,500 bbls	bbls
ıpacity (2-ft freeboard)	1477 bbls	
drilling pit	2970 bbls	

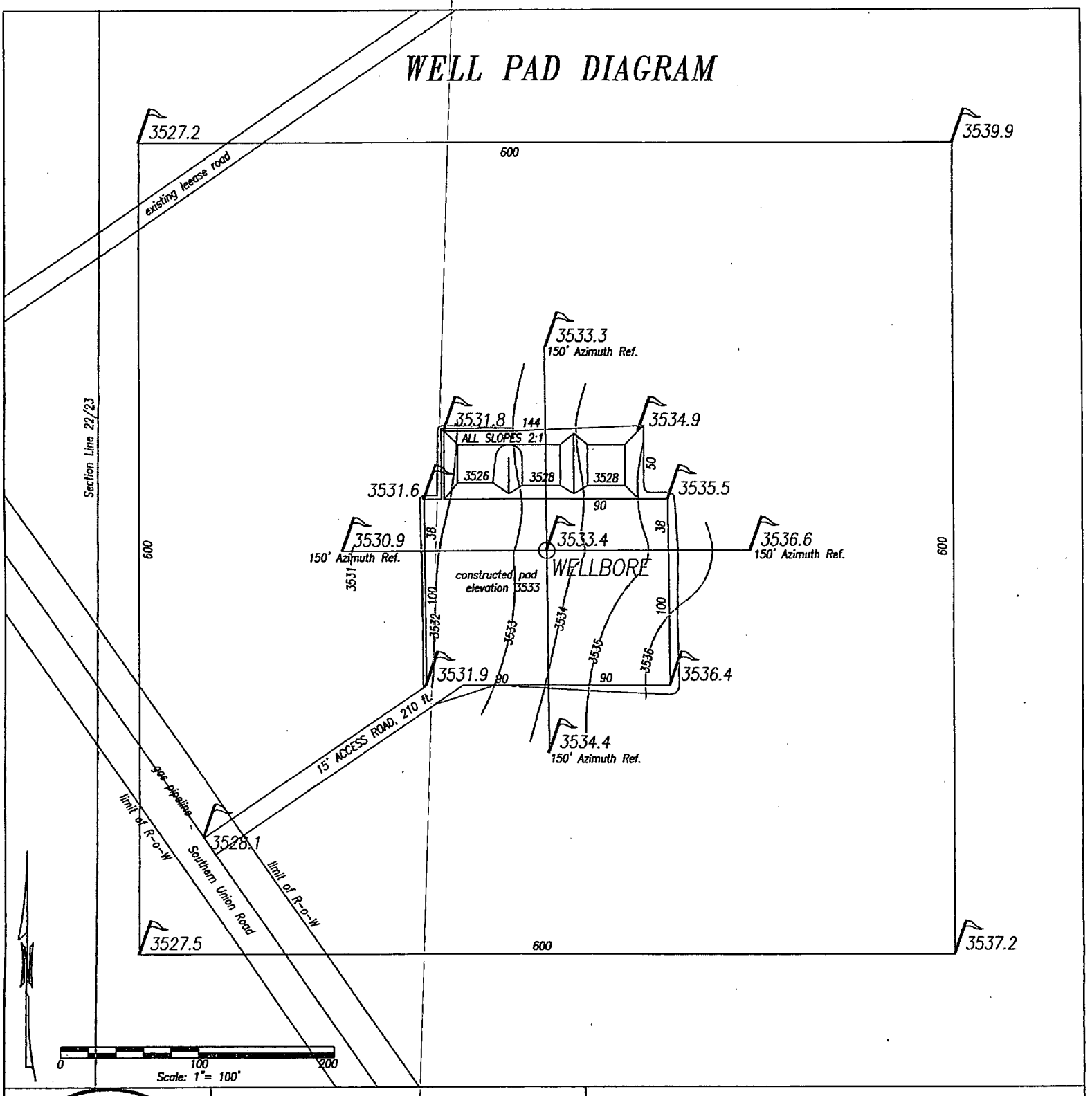
ge cell of drilling pit	55 feet	Slopes	2H:1V
ıe cell of drilling pit	50 feet	Slopes	2H:1V
cell of drilling pit	55 feet	Slopes	2H:1V
;ell of drilling pit	40 feet	Slopes	2H:1V
ıe cell of drilling pit	5		
;ell of drilling pit	6		

·ench/workover pit	55	Slopes	1H:1V
;nch/workover pit	40	Slopes	1H:1V
;nch/workover pit	6		



] of volume for cuttings at 4-feet
ırial trench 473 ft3

WELL PAD DIAGRAM



P. R. PATTON
STATE OF NEW MEXICO
6913
REGISTERED PROFESSIONAL ENGINEER

P.R. Patton & Associates
Consulting Engineers
Surveyors

Petroleum Bldg.
Roswell, N.M. 88203
575 / 622-9106

Read & Stevens, Inc.

HOT DOG 23 FED. No. 4
990 FSL 330 FWL, Sec. 23
T16S, R27E, N.M.P.M.,
EDDY COUNTY, NEW MEXICO

Appendix SSI-1

Photo-documentation

R.T. Hicks Consultants, Ltd.
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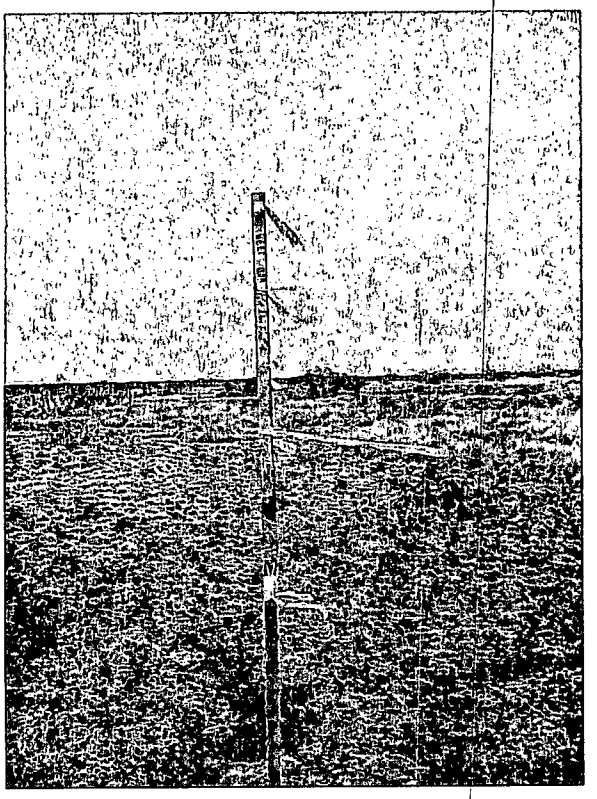
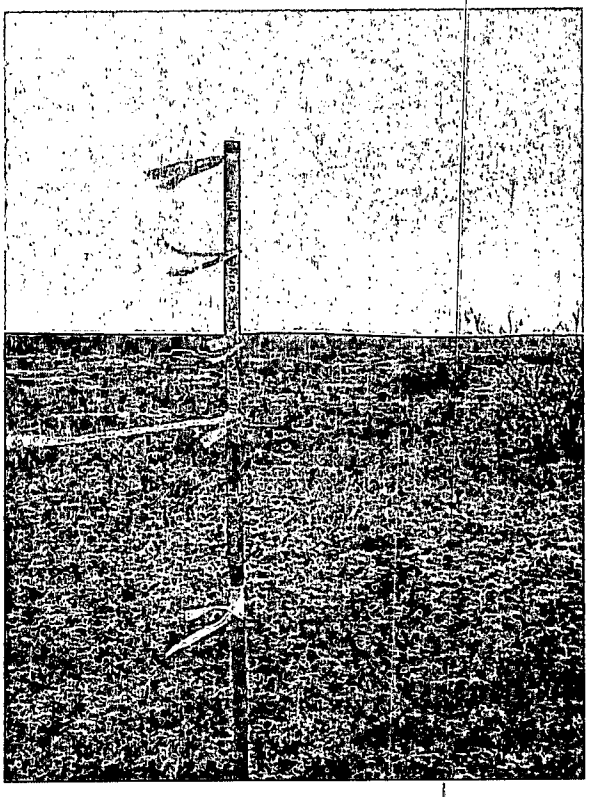
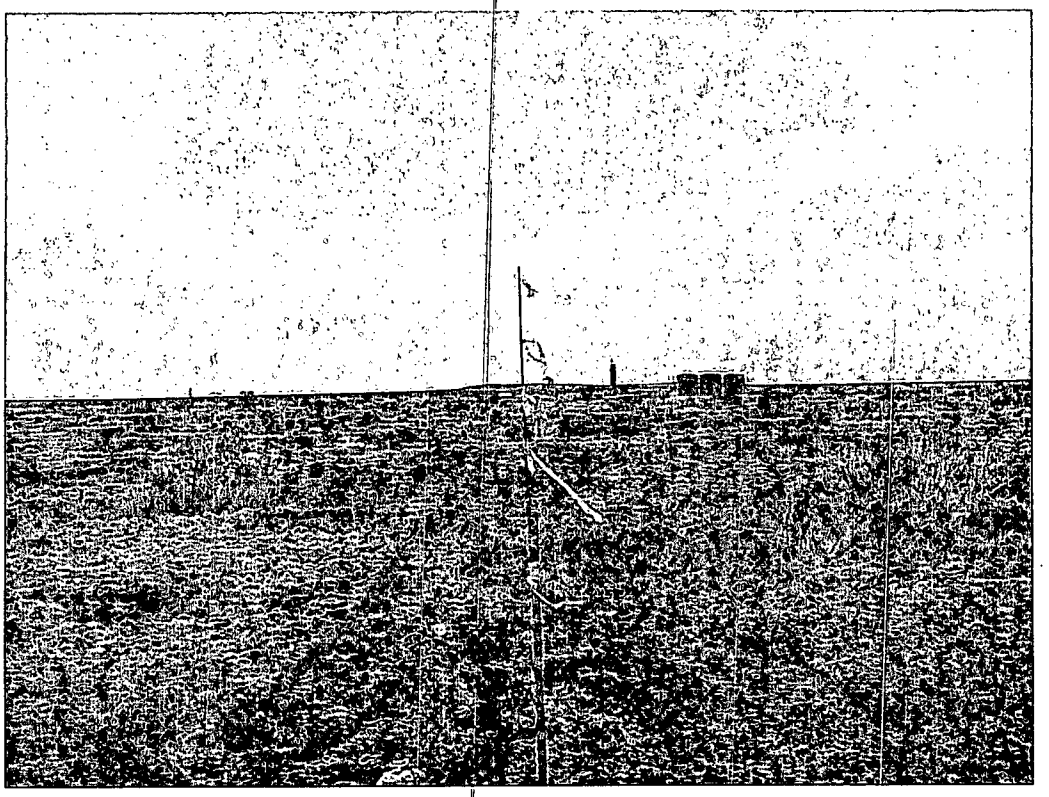
Albuquerque, NM 87104



View South



View North



View East

Appendix SSI-2
Mud Log Hot Dog 23 Federal #3

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

SELMAN AND ASSOCIATES, LTD.
GEOLOGICAL CONSULTING / SURFACE LOGGING SERVICES
P.O. BOX 61150
CORPUS CHRISTI TEXAS | MIDLAND TEXAS 79711 | ROCK SPRINGS WYOMING
OFFICE (432) 563 0084 -- 24 HOURS (800) 578 1006

Company:	READ & STEVENS, INC
Well:	HOT DOG 23 FEDERAL #3
Field:	DOG CANYON;GRAYBURG
API:	30-015-39190
Location:	2310' FSL & 1650' FWL, SEC.23, T-16-S,R-27-E
County:	EDDY **State:** NEW MEXICO
Logger:	G. GORMAN
Interval:	0' **To:** 1699'
Date:	9/6/2011 **To:** 9/7/2011
Unit:	41
Well#:	6417 **Kelly Bushing:** 0
Phone:	432-385-4441 **Ground Level:** 3564

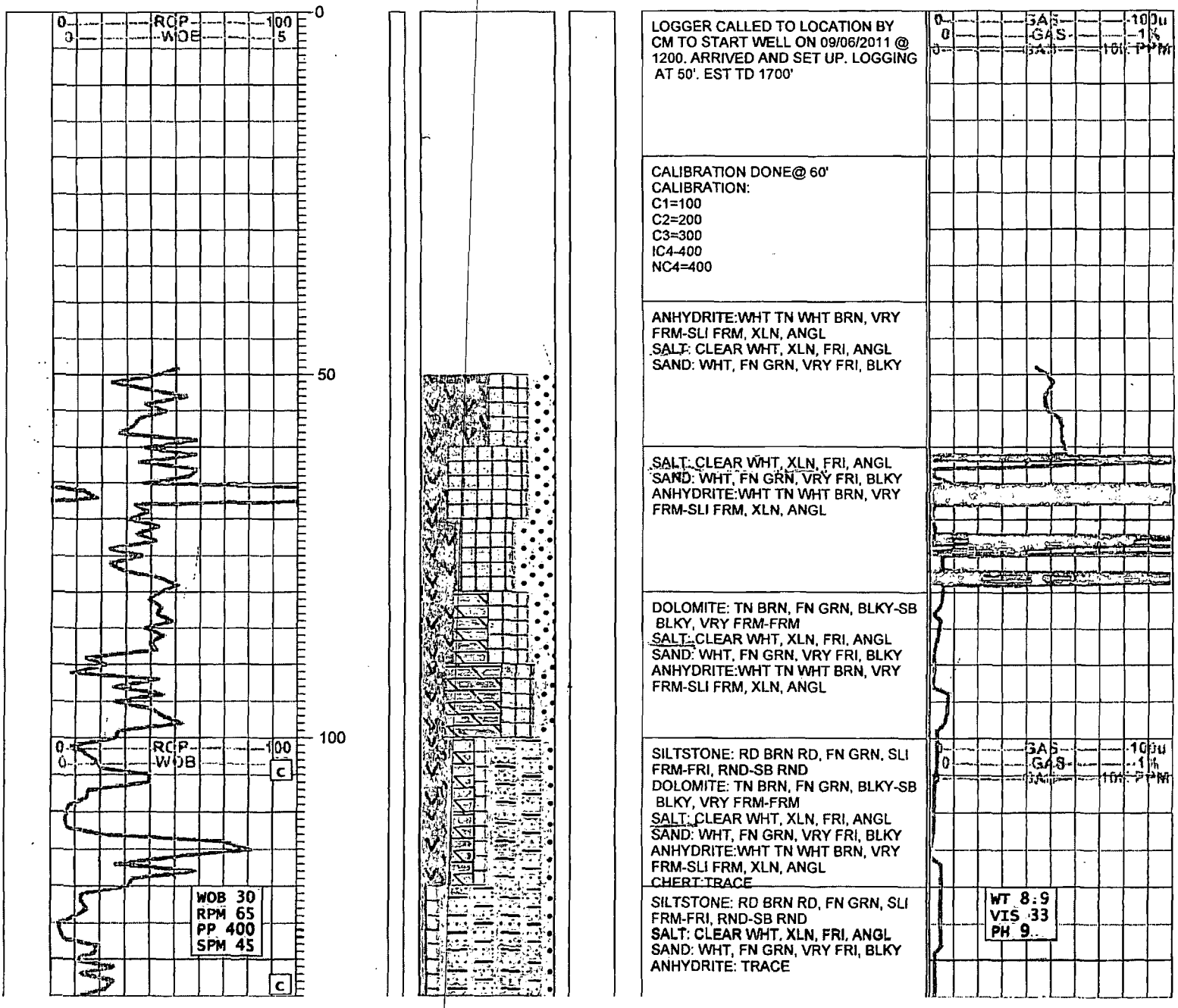
ANHYDRITE | CHERT | COAL
CONGLOMERATE | DOLOMITE | GRANITE
GRANITE WASH | LIMESTONE | SALT
SAND | SHALE | SILTSTONE

POROSITY - % CUT - FLUOR
TRACE | FAIR | GOOD

C-1 METH (PURPLE) C-4 BUT (BROWN)
C-2 ETH (GREEN)
C-3 PROP (DK BLUE) CO2 (DK PURPLE)

TOTAL GAS (RED)
0-----FLARE----100

Drill Rate (min) Wob (kLbs) | DEPTH | POR | CUTTINGS | %Cut Fluor | LITHOLOGY | GAS ANALYSIS (UNIT)



LOGGER CALLED TO LOCATION BY CM TO START WELL ON 09/06/2011 @ 1200. ARRIVED AND SET UP. LOGGING AT 50'. EST TD 1700'

CALIBRATION DONE@ 60'
CALIBRATION:
C1=100
C2=200
C3=300
IC4-400
NC4=400

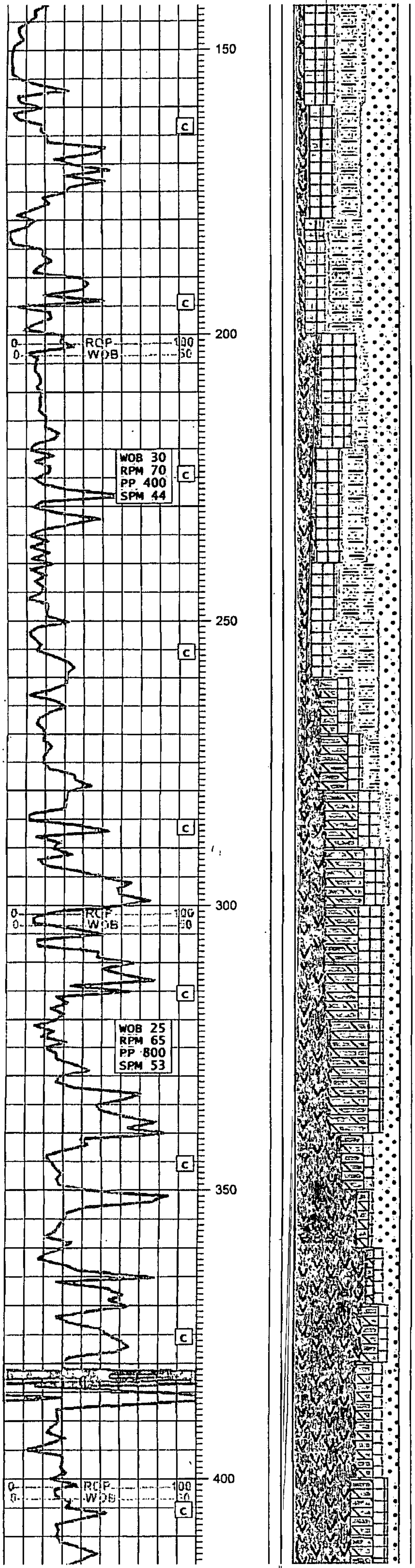
ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY

SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY
ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL

DOLOMITE: TN BRN, FN GRN, BLKY-SB BLKY, VRY FRM-FRM
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY
ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL

SILTSTONE: RD BRN RD, FN GRN, SLI FRM-FRI, RND-SB RND
DOLOMITE: TN BRN, FN GRN, BLKY-SB BLKY, VRY FRM-FRM
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY
ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL
CHERT:TRACE

SILTSTONE: RD BRN RD, FN GRN, SLI FRM-FRI, RND-SB RND
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY
ANHYDRITE: TRACE



FRM-FRI, RND-SB RND
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY
ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL

SAND: WHT, FN GRN, VRY FRI, BLKY
SALT: CLEAR WHT, XLN, FRI, ANGL
SILTSTONE: RD BRN RD, FN GRN, SLI FRM-FRI, RND-SB RND
ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL

SILTSTONE: RD BRN RD, FN GRN, SLI FRM-FRI, RND-SB RND
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY
ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL

SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY
ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL
SILTSTONE: RD BRN, FRM- SLI FRI, VRY FN GRN, RND-SB RND

SAND: WHT, FN GRN, VRY FRI, BLKY
SALT: CLEAR WHT, XLN, FRI, ANGL
ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL
SILTSTONE: RD BRN, FRM- SLI FRI, VRY FN GRN, RND-SB RND

SILTSTONE: RD BRN, FRM- SLI FRI, VRY FN GRN, RND-SB RND
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY
ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL

DOLOMITE: TN BRN, FN GRN, BLKY-SB BLKY, VRY FRM-FRM
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY
ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL
SILTSTONE: RD BRN, FRM- SLI FRI, VRY FN GRN, RND-SB RND

DOLOMITE: TN BRN, FN GRN, BLKY-SB BLKY, VRY FRM-FRM
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY
ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL
SILTSTONE: RD BRN, FRM- SLI FRI, VRY FN GRN, RND-SB RND

DOLOMITE: TN BRN, FN GRN, BLKY-SB BLKY, VRY FRM-FRM
ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY

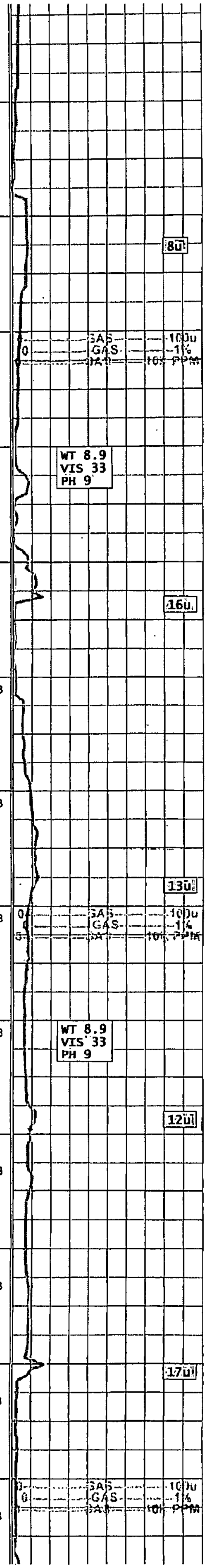
DOLOMITE: TN BRN, FN GRN, BLKY-SB BLKY, VRY FRM-FRM
ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY

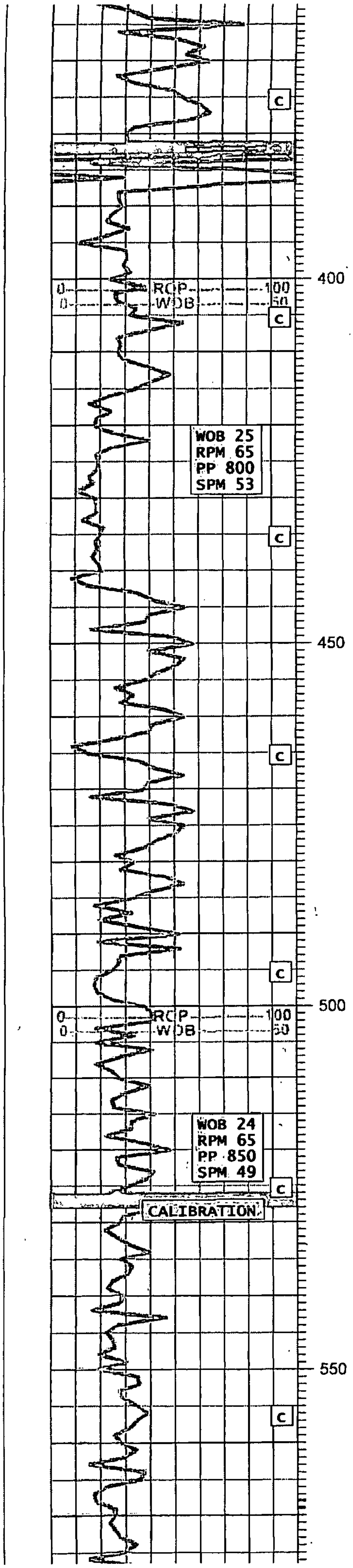
ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL-SB ANGL
DOLOMITE: TN BRN, FN GRN, BLKY-SB BLKY, VRY FRM-FRM
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY

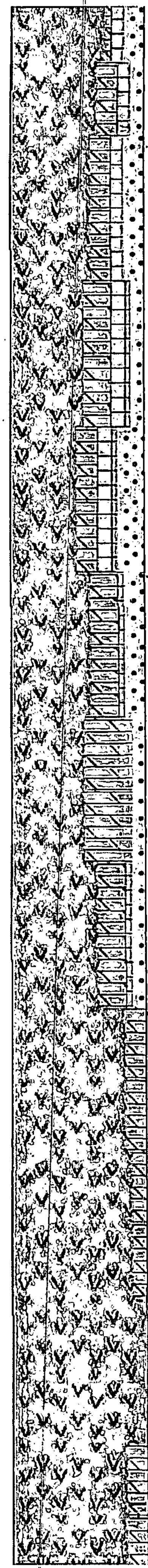
ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL-SB ANGL
DOLOMITE: TN BRN, FN GRN, BLKY-SB BLKY, VRY FRM-FRM
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY

ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL-SB ANGL
DOLOMITE: TN BRN, FN GRN, BLKY-SB BLKY, VRY FRM-FRM
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY

ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL-SB ANGL
DOLOMITE: TN BRN, FN GRN, BLKY-SB BLKY, VRY FRM-FRM
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY







ANHYDRITE:WHT TN WHT BRN, VRY
FRM-SLI FRM, XLN, ANGL-SB ANGL
DOLOMITE: TN BRN, FN GRN, BLKY-SB BLKY, VRY FRM-FRM
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY

ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL-SB ANGL
DOLOMITE: TN BRN, FN GRN, BLKY-SB BLKY, VRY FRM-FRM
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY

ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL-SB ANGL
DOLOMITE: TN BRN, FN GRN, BLKY-SB BLKY, VRY FRM-FRM
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY

ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL-SB ANGL
DOLOMITE: TN BRN, FN GRN, BLKY-SB BLKY, VRY FRM-FRM
SALT: CLEAR WHT, XLN, FRI, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY

ANHYDRITE:WHT TN WHT BRN, VRY FRM-SLI FRM, XLN, ANGL-SB ANGL
DOLOMITE: TN BRN, FN GRN, BLKY-SB BLKY, VRY FRM-FRM
SAND: WHT, FN GRN, VRY FRI, BLKY
SALT: TRACE

ANHYDRITE: TRANS WHT, VRY FRM-SLI FRM, FN XLN, ANGL
DOLOMITE: TN WHT, BLKY-SB BLKY, FRM-SLI FRM, VRY FN GRN
SAND: WHT, FN GRN, VRY FRI, BLKY-RD

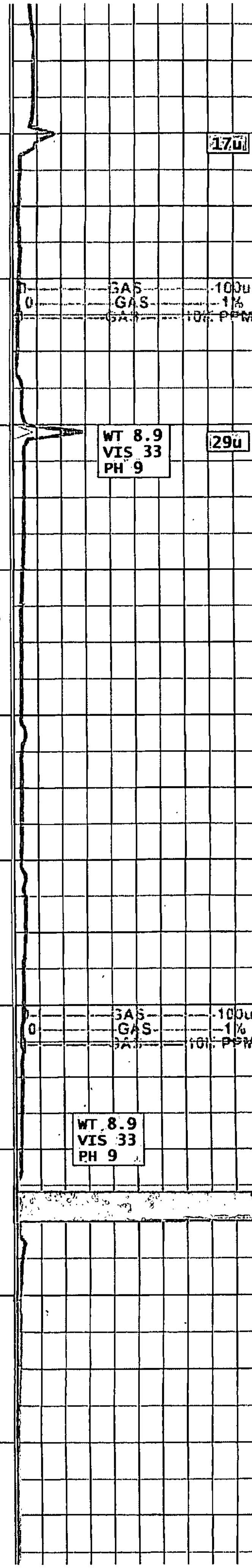
ANHYDRITE: TRANS WHT, VRY FRM-SLI FRM, FN XLN, ANGL
DOLOMITE: TN WHT, BLKY-SB BLKY, FRM-SLI FRM, VRY FN GRN
SAND: WHT, FN GRN, VRY FRI, BLKY-RD
SALT: TRACE

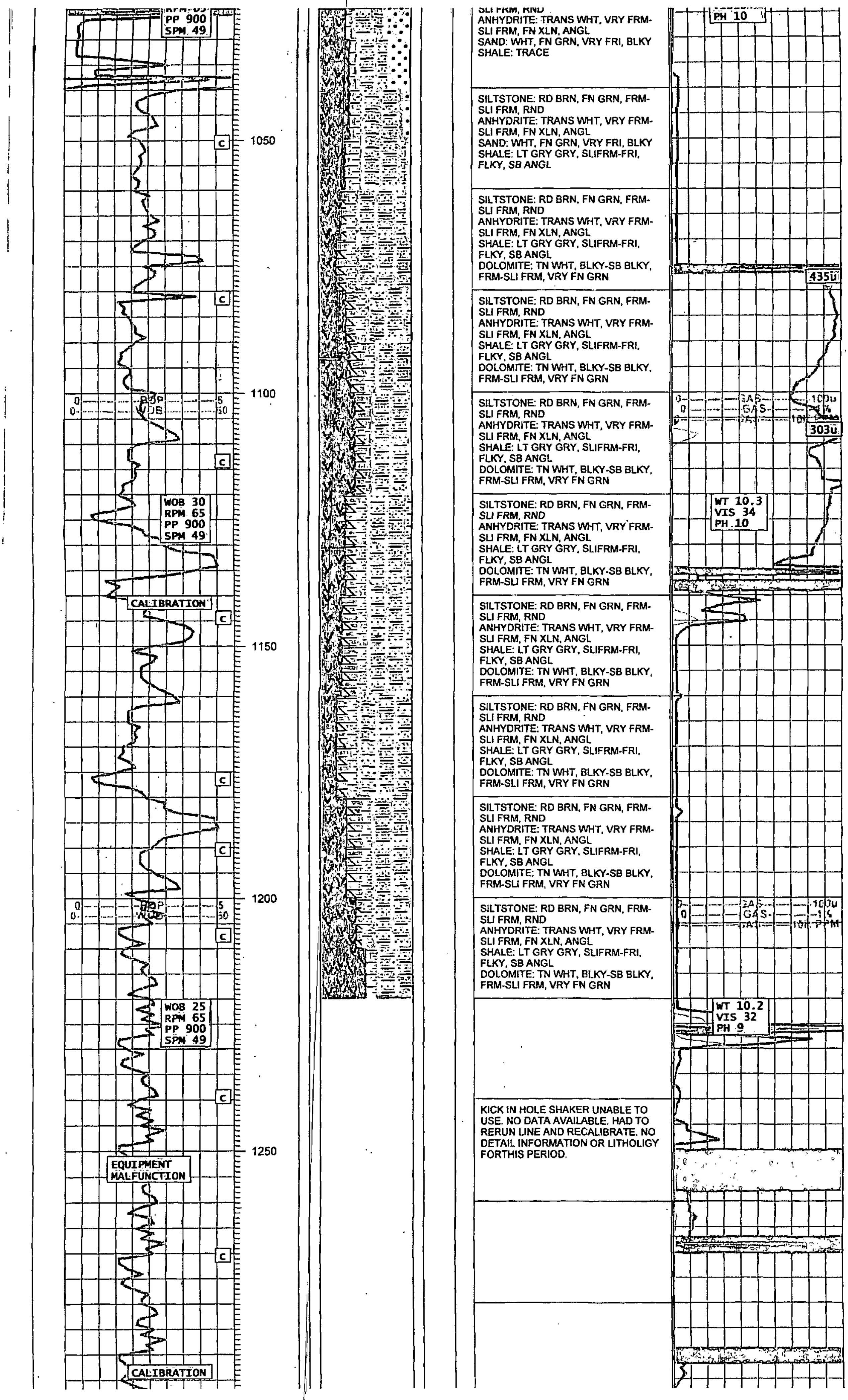
ANHYDRITE: TRANS WHT, VRY FRM-SLI FRM, FN XLN, ANGL
DOLOMITE: TN WHT, BLKY-SB BLKY, FRM-SLI FRM, VRY FN GRN

ANHYDRITE: TRANS WHT, VRY FRM-SLI FRM, FN XLN, ANGL
DOLOMITE: TN WHT, BLKY-SB BLKY, FRM-SLI FRM, VRY FN GRN

ANHYDRITE: TRANSWHT LT BRN AMBER, VRYFRM-FRM, FNXLN, ANGL

ANHYDRITE: TRANS WHT, VRY FRM-SLI FRM, FN XLN, ANGL
DOLOMITE: TN WHT, BLKY-SB BLKY, FRM-SLI FRM, VRY FN GRN




RPM 65
PP 900
SPM 49
1050
1100
0 ROP 5
0 WOB 50
WOB 30
RPM 65
PP 900
SPM 49
CALIBRATION
1150
1200
0 ROP 5
0 WOB 50
WOB 25
RPM 65
PP 900
SPM 49
1250
EQUIPMENT MALFUNCTION
CALIBRATION
SLI FRM, RND
ANHYDRITE: TRANS WHT, VRY FRM-SLI FRM, FN XLN, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY
SHALE: TRACE
SILTSTONE: RD BRN, FN GRN, FRM-SLI FRM, RND
ANHYDRITE: TRANS WHT, VRY FRM-SLI FRM, FN XLN, ANGL
SAND: WHT, FN GRN, VRY FRI, BLKY
SHALE: LT GRY GRY, SLIFRM-FRI, FLKY, SB ANGL
SILTSTONE: RD BRN, FN GRN, FRM-SLI FRM, RND
ANHYDRITE: TRANS WHT, VRY FRM-SLI FRM, FN XLN, ANGL
SHALE: LT GRY GRY, SLIFRM-FRI, FLKY, SB ANGL
DOLOMITE: TN WHT, BLKY-SB BLKY, FRM-SLI FRM, VRY FN GRN
SILTSTONE: RD BRN, FN GRN, FRM-SLI FRM, RND
ANHYDRITE: TRANS WHT, VRY FRM-SLI FRM, FN XLN, ANGL
SHALE: LT GRY GRY, SLIFRM-FRI, FLKY, SB ANGL
DOLOMITE: TN WHT, BLKY-SB BLKY, FRM-SLI FRM, VRY FN GRN
SILTSTONE: RD BRN, FN GRN, FRM-SLI FRM, RND
ANHYDRITE: TRANS WHT, VRY FRM-SLI FRM, FN XLN, ANGL
SHALE: LT GRY GRY, SLIFRM-FRI, FLKY, SB ANGL
DOLOMITE: TN WHT, BLKY-SB BLKY, FRM-SLI FRM, VRY FN GRN
SILTSTONE: RD BRN, FN GRN, FRM-SLI FRM, RND
ANHYDRITE: TRANS WHT, VRY FRM-SLI FRM, FN XLN, ANGL
SHALE: LT GRY GRY, SLIFRM-FRI, FLKY, SB ANGL
DOLOMITE: TN WHT, BLKY-SB BLKY, FRM-SLI FRM, VRY FN GRN
SILTSTONE: RD BRN, FN GRN, FRM-SLI FRM, RND
ANHYDRITE: TRANS WHT, VRY FRM-SLI FRM, FN XLN, ANGL
SHALE: LT GRY GRY, SLIFRM-FRI, FLKY, SB ANGL
DOLOMITE: TN WHT, BLKY-SB BLKY, FRM-SLI FRM, VRY FN GRN
SILTSTONE: RD BRN, FN GRN, FRM-SLI FRM, RND
ANHYDRITE: TRANS WHT, VRY FRM-SLI FRM, FN XLN, ANGL
SHALE: LT GRY GRY, SLIFRM-FRI, FLKY, SB ANGL
DOLOMITE: TN WHT, BLKY-SB BLKY, FRM-SLI FRM, VRY FN GRN
SILTSTONE: RD BRN, FN GRN, FRM-SLI FRM, RND
ANHYDRITE: TRANS WHT, VRY FRM-SLI FRM, FN XLN, ANGL
SHALE: LT GRY GRY, SLIFRM-FRI, FLKY, SB ANGL
DOLOMITE: TN WHT, BLKY-SB BLKY, FRM-SLI FRM, VRY FN GRN
SILTSTONE: RD BRN, FN GRN, FRM-SLI FRM, RND
ANHYDRITE: TRANS WHT, VRY FRM-SLI FRM, FN XLN, ANGL
SHALE: LT GRY GRY, SLIFRM-FRI, FLKY, SB ANGL
DOLOMITE: TN WHT, BLKY-SB BLKY, FRM-SLI FRM, VRY FN GRN
KICK IN HOLE SHAKER UNABLE TO USE. NO DATA AVAILABLE. HAD TO RERUN LINE AND RECALIBRATE. NO DETAIL INFORMATION OR LITHOLIGY FORTHIS PERIOD.
PH 10
435u
303u
WT 10.3
VIS 34
PH 10
WT 10.2
VIS 32
PH 9

Appendix SSI-3

Surface Owner Notification

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

Generic Plans for Temporary Pits

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

Temporary Pit Design Plan

Plates 1 and 2 within the Site Specific Information Section show the layout of the temporary pits proposed for this project. However, field conditions will determine the final configuration of the pits.

The operator will ensure that the temporary storage of fluids, fluid reuse or fluid disposal will be conducted in a manner approved by the division that prevents the contamination of fresh water and protects public health and the environment.

Design Plan- Operator Instructions

1. The design will contain liquids and solids and prevent contamination of fresh water and protect public health and the environment.
2. The design prevents run-on of surface water.
3. The operator will post an upright sign in compliance with 19.15.16.8 NMAC. The operator will post the sign in a manner and location such that a person can easily read the legend. The sign will provide the following information: the operator's name; the location of the site by quarter-quarter or unit letter, section, township and range; and emergency telephone numbers.
4. The pit will be completely fenced at all times excluding drilling and workover operations. During drilling or workover operations, the operator is not required to fence the edge of the pit adjacent to the drilling or workover rig.
5. The operator will maintain the fences in good repair from beginning of pit use to the time of pit closure.
6. Work with the drilling and lining contractor and provide for devices to protect the liner from any fluid force or mechanical damage at any point of discharge into or suction from the lined temporary pit.
7. The operator or operator's representative will inspect the pit before and after lining to ensure that construction the temporary pit
    a. Has not penetrated any solution features such as fissures, tubes or caves
    b. prevents unauthorized releases and ensure the confinement of liquids
    c. is consistent with the design criteria of Plates 1 and 2 or any agreed alteration to meet field conditions
    d. meets the prescriptive mandates outlined below

Construction Plan- Construction Contractor Instructions

A. Prior to constructing the pit the qualified contractor will examine Plates 1 and 2 and provide the operator (or operator's representative) with an affirmation of their understanding of the design.
B. The contractor will strip and stockpile the topsoil for use as the final cover or fill at the time of closure.
C. The temporary pit will have a properly constructed foundation and interior slopes consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear.
D. The slopes of the pit will be no steeper than 2 horizontal feet to 1 vertical foot (2H:1V).
E. Pit walls will be walked down by a crawler type tractor following construction.

F. As necessary, a berm or ditch will surround the temporary pit to prevent run-on of surface water.
G. Because solution cavities may be present at the site, the contractor will
    a. Inspect the excavation for voids, cavities, caves or similar features
    b. Notify the operator or the operator's representative if such features are encountered
H. As an addition engineering control to address any concerns relating to the presence of karst and associated instability, during construction of the pit the contractor will compact the earth material that forms the foundation for the pit liner. An expected proctor density of greater than 90% will be achieved by
    a. adding water to the earth material as appropriate,
    b. compacting the earth by walking a crawler-type tractor down the sides and bottom of the pit
    c. repeating this process with a second 6-inch lift of earth material if necessary

Construction Plan– Liner Contractor Instructions

I. Install a geomembrane liner.
II. The geomembrane liner will consist of 20-mil string reinforced LLDPE or equivalent liner material that the appropriate division district office approves. The geomembrane liner will be composed of an impervious, synthetic material that is resistant to petroleum hydrocarbons, salts and acidic and alkaline solutions. The liner material will be resistant to ultraviolet light. Liner compatibility will comply with EPA SW-846 method 9090A.
III. Minimize liner seams and orient them up and down, not across a slope.
IV. Use factory welded seams where possible.
V. Prior to any field seaming, the contractor will overlap liners four to six inches and orient seams parallel to the line of maximum slope, *i.e.*, oriented along, not across, the slope. The contractor will minimize the number of welded field seams in corners and irregularly shaped areas. Field seams will be welded by qualified personnel.
VI. Avoid excessive stress-strain on the liner.
VII. Geotextile will be placed under the liner where needed to reduce localized stress-strain or protuberances that may otherwise compromise the liner's integrity.
VIII. Anchor the edges of all liners in the bottom of a compacted earth-filled trench. The anchor trench will be at least 18 inches deep.
IX. Inspect any devices used to ensure that the liner is protected from any fluid force or mechanical damage at any point of discharge into or suction from the lined temporary pit.
X. Fence the pit in a manner that prevents unauthorized access. The contractor will fence the pit to exclude livestock with a four foot fence that has at least four strands of barbed wire evenly spaced in the interval between one foot and four feet above ground level.

Operating and Maintenance Plan

The operator will operate and maintain the pit to contain liquids and solids. The operator will maintain the integrity of the liner to prevent contamination of fresh water and protect public health and the environment as described below.

1. If feasible, the operator will recycle, reuse or reclaim of all fluids in the temporary pit in a manner approved by division rules that prevents the contamination of fresh water and protects public health and the environment.
2. If re-use is not possible, fluids will be sent to disposal at division-approved facility.
3. The operator will not discharge into or store any hazardous waste in the pit.
4. If any pit liner's integrity is compromised, or if any penetration of the liner occurs above the liquid's surface, then the operator will notify the appropriate division district office within 48 hours (phone or email) of the discovery and repair the damage or replace the liner.
5. If the pit develops a leak or if any penetration of the pit liner occurs below the liquid's surface, then the operator will remove all liquid above the damage or leak line within 48 hours, notify the district office within 48 hours (phone or email) of the discovery and repair the damage or replace the pit liner.
6. The injection or withdrawal of liquids from the pit will be accomplished through a header, diverter or other hardware that prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes.
7. The operator will install diversion ditches and berms around the pit as necessary to prevent the collection of surface water run-on.
8. The operator will immediately remove any visible layer of oil from the surface of the temporary pit and maintain on site an oil absorbent boom to contain and remove oil from the pit's surface.
9. Only fluids used or generated during the drilling or workover process will be discharged into the temporary pit.
10. The operator will maintain the temporary pit free of miscellaneous solid waste or debris.
11. Immediately after cessation of stimulation, the operator will remove any visible or measurable layer of oil from the surface of a pit, in the manner described above.
12. The operator will maintain at least two feet of freeboard for the temporary pit.
13. The operator will inspect the temporary pit containing fluids at least daily during stimulation to ensure compliance with this plan.
14. After stimulation operations, the operator will inspect the temporary pit weekly so long as free liquids remain in the temporary pit.
15. The operator will maintain a log of such inspections and make the log available for the district office's review upon request.
16. The operator will file a copy of the log with the appropriate division district office when the operator closes the temporary pit.
17. The operator will remove all free liquids from the temporary pit within 30 days from the date that the operator releases the stimulation rig – unless granted an extension of time by the District Office. The operator will note the date of the stimulation rig's release on form C-105 or C-103 upon well completion.

Closure Plan- General Conditions

The preferred closure alternative is in-place closure. If the residual solids in the temporary pit do not meet the criteria for in-place closure but meet the criteria for trench burial, the operator will proceed with trench burial.

Protocols and Procedures

The operator will use the following procedures and protocols to implement the closure:

- The operator will notify the landowner, prior to closure, that the operator plans to close the temporary pit by certified mail, return receipt requested.
- The operator of the temporary pit will notify the division district office verbally or by email at least 72 hours, but not more than one week, prior to any closure operation. The notice will include the operator's name and the location to be closed by unit letter, section, township and range, well's name, number, the API number.
- The operator of the temporary pit will remove all liquids from the temporary pit prior to closure and either:
    - Dispose of the liquids in a division-approved facility, or
    - Recycle, reuse or reclaim the liquids in a manner approved by the district office.
- The operator shall remove all free liquids from the temporary pit within 30 days from the date that the operator released the rig. The operator shall note the date of the rig's release on form C-105 or C-103 upon well completion. The operator will request an extension of up to three months from the appropriate division district office if necessary to allow for water re-use.
- The operator will close the temporary pit within six months of the date that the operator releases the rig. An extension not to exceed three months may be requested of the district office.
- The operator will close the pit by an earlier date that the division requires because of imminent danger to fresh water, public health or the environment.
- Within 60 days of closure completion, the operator will submit a closure report on form C-144, with necessary attachments to document all closure activities including sampling results; information required by 19.15.17 NMAC; a plot plan; and details on back-filling, capping and covering, where applicable.
- In the closure report, the operator will certify that all information in the report and attachments is correct and that the operator has complied with all applicable closure requirements and conditions specified in the approved closure plan.
- The operator will provide a plat of the pit location on form C-105 with the closure report within 60 days of closing the temporary pit.

Additional Protocols and Procedures for On-Site Closure

- The operator has provided the surface owner notice of the operator's proposal of an on-site closure (see Appendix SSI-3 for proof of notice to the landowner) as required in 19.15.17.13.F(1)(b).
- Upon receipt of NMOCD approval for on-site closure, the operator will notify the surface owner by certified mail, return receipt requested, that the operator plans to close the pit

and where the operator has approval for on-site closure. Evidence of mailing of the notice will demonstrate compliance with this requirement.

- The operator will place a steel marker at the center of an on-site burial if on-site burial occurs for the temporary pit. The steel marker will be not less than four inches in diameter and will be cemented in a three-foot deep hole at a minimum. The steel marker will extend at least four feet above mean ground level and at least three feet below ground level. The operator name, lease name and well number and location, including unit letter, section, township and range, and that the marker designates an on-site burial location will be welded, stamped or otherwise permanently engraved into the metal of the steel marker.
- The operator will report the exact location of any on-site burial on form C-105 filed with the division.
- The operator will file a deed notice identifying the exact location of any on-site burial with the county clerk in the county. The exact location of any on-site burial will be transmitted to the surface owner by copy of the form C-105 discussed above.

In-place closure is the preferred closure alternative for the temporary pit .

- If waste sampling results suggest that standards for in-place closure are not met, the operator will implement excavation and removal

Site Reclamation Plan

After the operator has closed the pit, the operator will reclaim the pit location and all areas associated with the pit, including associated access roads to a safe and stable condition that blends with the surrounding undisturbed area. The operator will substantially restore the impacted surface area to the condition that existed prior to oil and gas operations by placement of the soil cover as provided in Subsection H of 19.15.17.13 NMAC, recontour the location and associated areas to a contour that approximates the original contour and blends with the surrounding topography and re-vegetate according to Subsection I of 19.15.17.13 NMAC.

Soil Cover Design Plan

If the operator removes the pit contents or remediates any contaminated soil to the division's satisfaction the soil cover will consist of the background thickness of topsoil or one foot of suitable material to establish vegetation at the site, whichever is greater.

The soil cover for the in-place burial will consist of a minimum of four feet of compacted, non-waste containing, earthen material. The soil cover will include either the background thickness of topsoil or one foot of suitable material to establish vegetation at the site, whichever is greater.

The operator will construct the soil cover to the site's existing grade and prevent ponding of water and erosion of the cover material.

Re-vegetation Plan

1. The first growing season after the operator closes the pit, including access roads, the operator will seed or plant the disturbed areas.
2. The operator will accomplish seeding by drilling on the contour whenever practical.
3. The operator will obtain vegetative cover that equals 70% of the native perennial vegetative cover (un-impacted by overgrazing, fire or other intrusion damaging to native vegetation).

4. The operator will follow surface owner mandates for the seed mixture and maintain that cover through two successive growing seasons.
5. During the two growing seasons that prove viability, there will be no artificial irrigation of the vegetation.
6. The operator will repeat seeding or planting until it successfully achieves the required vegetative cover.
7. If conditions are not favorable for the establishment of vegetation, such as periods of drought, the operator may request that the division allow the operator to delay seeding or planting until soil moisture conditions become favorable or may require the operator to use additional cultural techniques such as mulching, fertilizing, irrigating, fencing or other practices.
8. The operator will notify the division when it has seeded or planted and when it successfully achieves re-vegetation.

In-place Closure Plan

In the event that sampling of the solids in the temporary pit demonstrates that the pit meets the criteria for in-place closure, the operator will proceed with in-place closure

Siting Criteria Compliance Demonstration for In-Place Burial

The Siting Criteria Compliance Demonstration for the temporary pit (see Site Specific Information) show that the requirements of 19.15.17.10 NMAC are met for in-place closure.

Waste Material Sampling Plan for In-place Burial

Because the groundwater is more than 100 feet below the bottom of the buried waste (see above), the operator will collect at a minimum, a five point, composite sample of the contents of the temporary pit after treatment or stabilization.

The purpose of the sampling the waste material is to demonstrate that after stabilization with three parts clean fill:

- Benzene, as determined by EPA SW 846 method 8021B or 8260B, does not exceed 0.2 mg/kg;
- Total BTEX, as determined by EPA SW-846 method 8021B or 8260B, does not exceed 50 mg/kg;
- The GRO and DRO combined fraction, as determined by EPA SW-846 method 8015M, does not exceed 500 mg/kg;
- TPH, as determined by EPA method 418.1 does not exceed 2,500 mg/kg;
- Chloride, as determined by EPA method 300.1, does not exceed 1,000 mg/kg or the background concentration, whichever is greater.

Protocols and Procedures for In-Place Burial

In addition to the General Conditions Protocols and Procedures and the Additional Protocols and Procedures for On-site Closure listed above, the operator will execute the following steps for in-place closure of the pit.

A. The operator will measure the distance between the top of any solids in the pit and existing grade to determine if stabilized waste (see stabilization methods, below) will be at least 4-feet below existing grade to allow installation of the soil cover (see soil cover design, above).

B. The operator will stabilize or solidify the contents of the pit to a bearing capacity sufficient to support the temporary pit's final cover. However, the operator will not mix the pit contents with soil or other material at a mixing ratio of greater than 3:1, (3 parts soil or other material to 1 part temporary pit solids).
C. Cover the geomembrane lined, filled, temporary pit with compacted, non-waste containing, earthen material; construct a division-prescribed soil cover; recontour and re-vegetate the site as described in this plan. Specifically, a 4-foot thick soil cover consistent with NMOCD Rules will be placed over the stabilized waste.
D. Any excess liner above the stabilized waste will be removed for re-use or disposal.

On-Site Trench Burial Plan

Siting Criteria Compliance Demonstration for In-Place Burial

The Siting Criteria Compliance Demonstration for the temporary pit (see Site Specific Information) show that the requirements of 19.15.17.10 NMAC are met for trench burial.

Protocols and Procedures for On-Site Trench Burial

In addition to the General Conditions Protocols and Procedures listed above, the operator will employ the following steps for On-Site Trench Burial of the pit.

1. The pit liner will be removed above the mud level for re-use if possible. We will use a utility knife and manual power to remove the liner.
2. The operator will stabilize the waste to permit transfer from the pit to the separate trench.
3. The operator will further stabilize or solidify the contents to a bearing capacity sufficient to support the final cover.
4. The operator will not mix the contents with soil or other material at a mixing ratio of greater than 3:1, (3 parts soil or other material to 1 part drilling waste). Specifically, the drilling waste will be stabilized in the pit by adding no more than 3 parts clean fill derived from the excavation of the pit to 1 part drilling waste.
5. After stabilization such that the waste material will support the soil cover, the mixture will be sampled pursuant to NMOCD Rules (see below) and placed in the burial trench.

Construction/Design of Burial Trench

The operator will design and construct on-site trench for closure as specified in 19.15.17.13B.(2) NMAC. Specifically:

I. The operator will excavate a separate trench to an appropriate depth that allows for the installation of the geomembrane bottom liner, burial of the drilling waste, geomembrane liner cover and the division-prescribed soil cover required pursuant to 19.15.17.13.H NMAC.
II. The on-site trench will have a properly constructed foundation and side walls consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear.
III. Geotextile will be placed under the liner where needed to reduce localized stress-strain or protuberances that may otherwise compromise the liner's integrity.

IV. The on-site trench will be constructed with a geomembrane liner that consists of a 20-mil string reinforced LLDPE liner
V. The geomembrane liner is composed of an impervious, synthetic material that is resistant to petroleum hydrocarbons, salts and acidic and alkaline solutions. The liner material will be resistant to ultraviolet light. Liner compatibility will comply with EPA SW-846 method 9090A.
VI. The contractor for the operator will minimize liner seams and orient them up and down, not across a slope. The operator will use factory welded seams where possible. Prior to field seaming, the operator will overlap liners four to six inches and orient liner seams parallel to the line of maximum slope, *i.e.*, oriented along, not across, the slope. The operator will minimize the number of field seams in corners and irregularly shaped areas.
VII. Qualified personnel will perform field seaming. The contractor will weld field liner seams.
VIII. The contractor for the operator will install sufficient liner material to reduce stress-strain on the liner.
IX. The operator will ensure that the outer edges of all liners are secured for the placement of the excavated waste material into the drilling pit (on-site trench).
X. The contractor for the operator will fold the outer edges of the drilling pit (on-site trench) liner to overlap the waste material in the pit (on-site trench) prior to the installation of the geomembrane cover.
XI. The contractor for the operator will install a geomembrane cover over the waste material in the lined trench. The operator will install the geomembrane cover in a manner that prevents the collection of infiltration water in the lined trench and on the geomembrane cover after the soil cover is in place.
XII. The geomembrane cover will consist of a 20-mil string reinforced LLDPE liner. The geomembrane cover will be composed of an impervious, synthetic material that is resistant to petroleum hydrocarbons, salts and acidic and alkaline solutions. Cover compatibility will comply with EPA SW-846 method 9090A.

Waste Material Sampling Plan for On-Site Trench Burial

Because the ground water is more than 100 feet below the bottom of the buried waste (see previously submitted Supplemental Documentation to C-144), the operator will collect at a minimum, a five point, composite sample of the contents of the portion of the temporary pit scheduled for trench burial after treatment or stabilization. The purpose of the sampling after the waste material is stabilized is to demonstrate that:

- The TPH concentration, as determined by EPA method 418.1 or other EPA method that the division approves, does not exceed 2500 mg/kg.
- Using EPA SW-846 method 1312
    - The chloride concentration, as determined by EPA method 300.1 or other EPA method that the division approves, does not exceed 3,000 mg/L or the background concentration, whichever is greater,
    - The concentrations of the inorganic water contaminants specified in Subsection A of 20.6.2.3103 NMAC as determined by appropriate EPA methods do not exceed the standards specified in Subsection A of 20.6.2.3103 NMAC or the background concentration, whichever is greater, and

- The concentrations of the organic water contaminants specified in Subsection A of 20.6.2.3103 NMAC as determined by appropriate EPA methods do not exceed the standards specified in Subsection A of 20.6.2.3103 NMAC, unless otherwise specified by NMOCD Rules

Confirmation Sampling Plan for On-Site Trench Burial

The operator will test the soils beneath the temporary pit after excavation and prior to trench burial to determine whether a release has occurred. To determine if a release has occurred, the operator and/or qualified contractor will collect, at a minimum:

- A five point, composite sample;
- Individual grab samples from any area that is wet, discolored or showing other evidence of a release.

The operator or qualified contractor will analyze these samples using NMOCD approved EPA methods for:

- Benzene,
- Total BTEX,
- TPH,
- The GRO and DRO combined fraction and
- Chloride

The purpose of this sampling is to demonstrate that:

1. Benzene, as determined by EPA SW-846 method 8021B or 8260B does not exceed 0.2 mg/kg;
2. Total BTEX, as determined by EPA SW-846 method 8021B or 8260B does not exceed 50 mg/kg;
3. The GRO and DRO combined fraction, as determined by EPA SW-846 method 8015M, does not exceed 500 mg/kg;
4. The TPH, as determined by EPA method 418.1 does not exceed 2,500 mg/kg; and
5. Chloride, as determined by EPA method 300.1, does not exceed 1,000 mg/kg or the background concentration, whichever is greater.

Reporting

The operator shall notify the division of its results of on form C-141. If the operator or the division determines that a release has occurred, then the operator will comply with 19.15.29 NMAC and 19.15.30 NMAC, as appropriate.

Excavation and Removal Closure Plan

IF THE CRITERIA FOR ON-SITE CLOSURE ARE NOT MET, THE OPERATOR WILL ADHERE TO NMOCD RULES AND IMPLEMENT THE FOLLOWING ACTIONS:

Protocols and Procedures for Excavation and Removal

The operator will close the temporary pit by excavating all contents and any synthetic pit liners that cannot be re-used and transferring those materials to one of the division-approved facilities listed below:

Controlled Recovery, Inc.	NM-01-0006
Lea Land, LLC	NM-01-0035

If the sampling program described below demonstrates that a release has not occurred or that any release does not exceed the concentrations specified in Subparagraph (b.ii) of Paragraph (1) of Subsection B of 19.15.17.13 NMAC, then the operator will:

1. Backfill the temporary pit excavation with compacted, non-waste containing, earthen material;
2. Construct a division-prescribed soil cover to existing grade as described in the Soil Cover Plan (above);
3. Recontour and re vegetate the site as described in the Revegetation Plan (above).

Confirmation Sampling Plan for Excavation and Removal

The operator will test the soils beneath the temporary pit after excavation to determine whether a release has occurred. To determine if a release has occurred, the operator and/or qualified contractor will collect, at a minimum:

- A five point, composite sample and;
- Individual grab samples from any area that is wet, discolored or showing other evidence of a release

The purpose of this sampling is to demonstrate that:

- Benzene, as determined by EPA SW-846 method 8021B or 8260B does not exceed 0.2 mg/kg;
- Total BTEX, as determined by EPA SW-846 method 8021B or 8260B does not exceed 50 mg/kg;
- The GRO and DRO combined fraction, as determined by EPA SW-846 method 8015M, does not exceed 500 mg/kg;
- The TPH, as determined by EPA method 418.1 does not exceed 2,500 mg/kg; and
- Chloride, as determined by EPA method 300.1, does not exceed 1,000 mg/kg or the background concentration, whichever is greater.

Reporting

The operator shall notify the division of its results of on form C-141. If the operator or the division determines that a release has occurred, then the operator will comply with 19.15.29 NMAC and 19.15.30 NMAC, as appropriate.